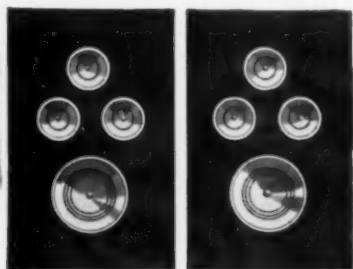
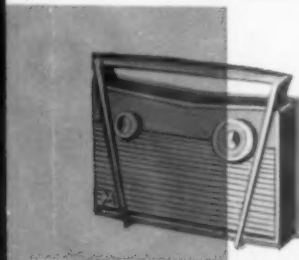
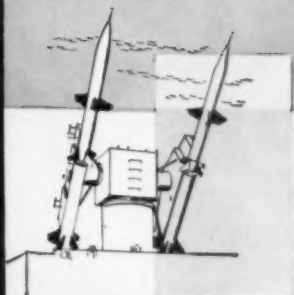


APRIL 1959

MACHINE AND TOOL

# blue book



Interview with Motorola's  
**ROBERT W. GALVIN**

"Production engineers . . .  
their status is higher."

# 5 Basic Reasons why MARVEL HACK SAWS CUT-OFF MORE ACCURATELY...

The consistently accurate performance of MARVEL Heavy Duty Hack Saws is no accident. MARVEL engineers knew, many years ago, that to produce and maintain accurate cutting-off, a hack saw must be designed and built like a fine machine tool.

Some of the basic design principles built into the modern MARVEL Hack Saws that makes it the most accurate cutting-off method you can use are:

## 1. V-Way Design...Greater Rigidity

Upright and Saddle are precision machined and fitted to form a rigid, integral unit capable of withstanding any cutting lead with no deflection or side movement.

## 2. Anti-Friction Bearing Construction

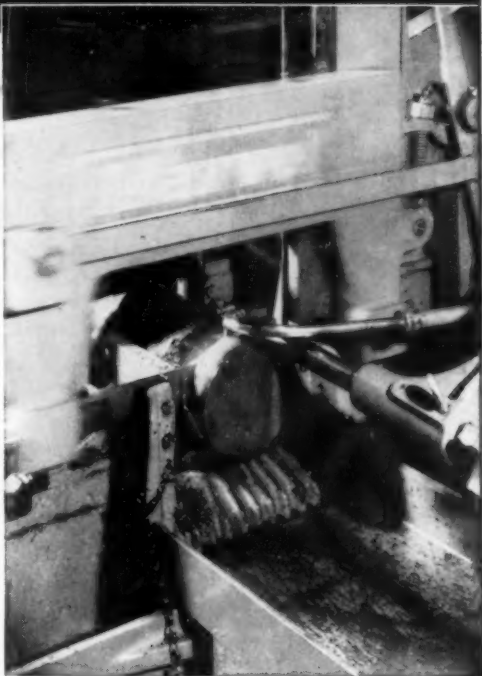
Anti-friction ball or roller bearings are used at all lead carrying points. Even the strongly braced saw frame reciprocates on heavy duty, fully enclosed preloaded ball bearings which provide permanent, frictionless rigidity and true-running, straight line cutting strokes.

## 3. Minimum Blade Frame Reach

Close-coupled design and crank lever action of MARVEL Saws keeps the saw frame and blade reach very short in relation to the vertical V-ways on which the unit is mounted. This insures optimum rigidity, even under the most severe operating conditions.

## 4. Positive Relief Blade Lift

On the return stroke, positive relief lift raises the blade to provide proper and "cushioned" lead-in on the next cutting stroke. This prolongs blade sharpness, life and accuracy.



## 5. Rigid Cutting Tool

Cutting-off accuracy requires a rigidly held, relatively short cutting tool. MARVEL Unbreakable High-Speed-Edge Hack Saw Blades, which combine a narrow high speed steel cutting edge permanently welded to a tough alloy steel body, can be tensioned from 200% to 300% more taut than ordinary blades. This provides a most rigid cutting edge.

Catalog C85 has complete details, facts and figures on both Marvel metal cutting Hack Saws and Band Saws. Write for it today.

19-1305

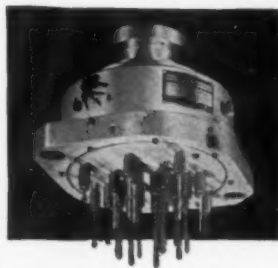


**ARMSTRONG-BLUM MFG. CO.**  
5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.

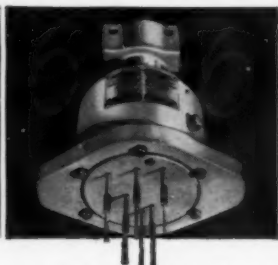


# HEADS for DRILLING, REAMING and TAPPING

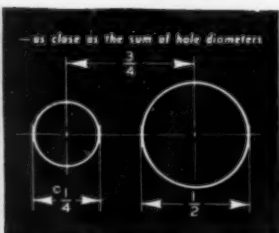
**Any Number of Holes, in Any Pattern,  
in Any Material, on All Centers**



Round, rectangular, and diamond shaped housings standard. Special, heavy duty heads available. All the spindles the jobs need.



Zagar "66" holds up to 6 spindles;  $3\frac{1}{2}$ " spread; maximum drill dia.  $5/16$ ". Low price, quick delivery.



Varying size holes, of varying depths on all centers are drilled in one pass. Hole patterns can be changed with a minimum of expense and delay.

Standard Zagar gearless drill heads can be installed on your drill press or in complete machining units. The gearless principle permits larger number of spindles for holes to be drilled, reamed or tapped simultaneously. Exclusive chip breaker action provides additional economies.



Write for  
Manual "B-4" for  
engineering data.

Zagar's answer to increasing hole production is in more spindles and fewer machines. Send in your drilling problem to Zagar or contact the nearest representative whose listing appears in the telephone book.

**Zagar** **ZAGAR, INCORPORATED** 23900 LAKELAND BLVD.  
CLEVELAND 23, OHIO  
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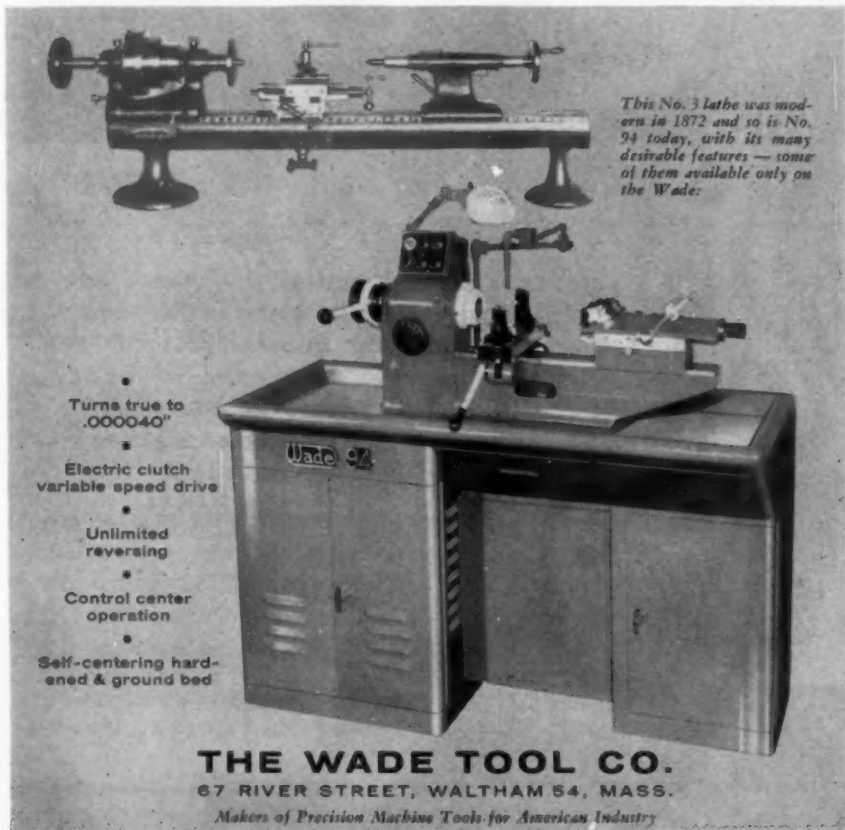
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If you're interested in knowing more about this well-designed, modern lathe, with more than 86 years of integrity behind it, write for our new brochure on the **Wade No. 94 Lathe**.



*This No. 3 lathe was modern in 1872 and so is No. 94 today, with its many desirable features — some of them available only on the Wade:*

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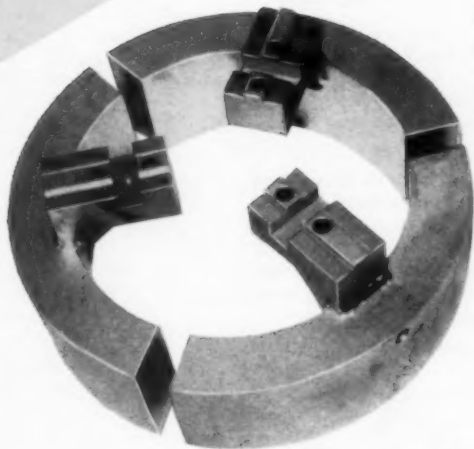
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MACHINE and TOOL BLUE BOOK

# Reader's Guide



APRIL, 1959

VOL. 54 - No. 4

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Hitchcock District Managers are listed on Page 64.

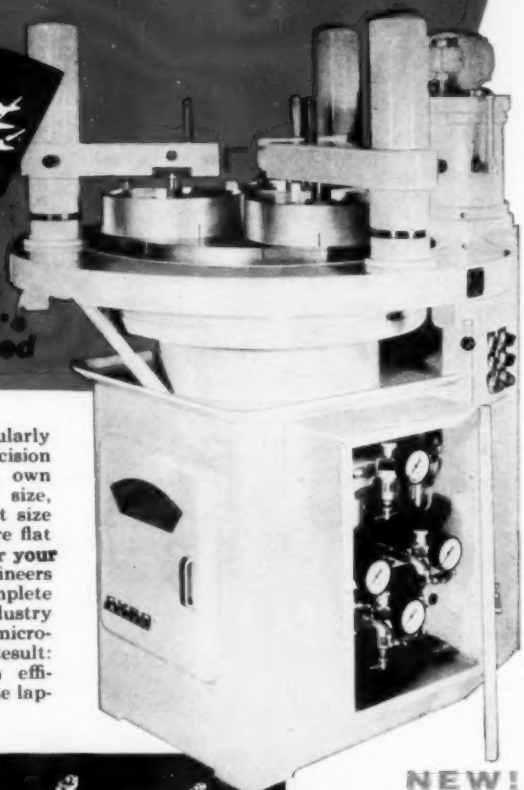
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SELECT THE UNIT DESIGNED FOR YOU**

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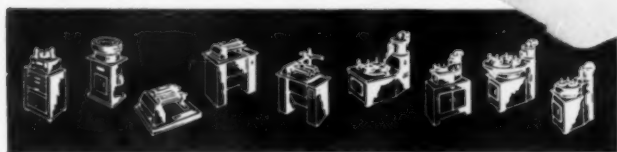
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lapping machines  
for any piece part...  
any production speed**

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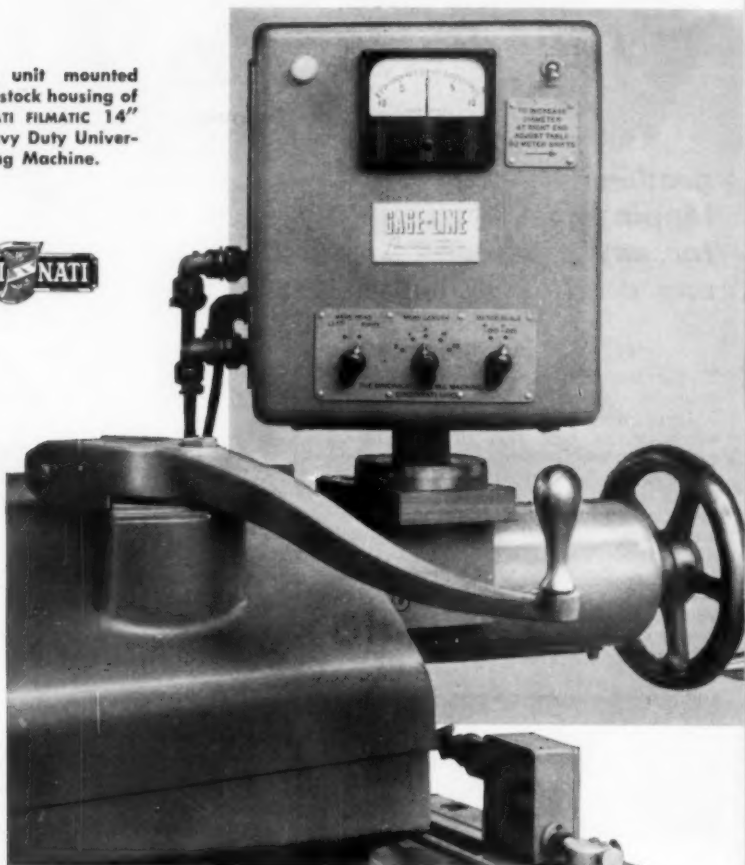
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# CINCINNATI

## gives you positive correction

Gage-Line unit mounted on the footstock housing of a CINCINNATI FILMATIC 14" x 36" Heavy Duty Universal Grinding Machine.



# CINCINNATI®

CENTERTYPE GRINDING MACHINES • CENTERLES  
MICRO-CENTRIC GRINDING MACHINES • CHUCKIN



# GAGE-LINE UNIT

## of taper ... quickly; accurately

Taper is an elusive factor in center-type grinding. The cut and try method of eliminating or correcting it is expensive and quite often wasteful of nearly-finished parts. Gage-Line is Cincinnati's answer to precise taper control. It is an electronic taper correcting unit which eliminates trial and error with amazing sureness and accuracy. ¶Here's the way it works.

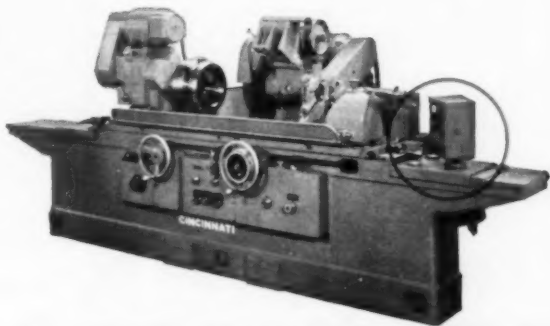
A gage head is mounted on each end of the table, and an electronic control unit is mounted on the right-hand end of the machine. When the swivel table is adjusted, the control unit

electronically translates the signal from each gage head to a graduated meter, reading direct for amount of movement and length of workpiece.

¶Gage-Line unit is another forward step by Cincinnati in their continuing efforts to improve the accuracy and reduce the cost of precision center-type grinding. Gage-Line is available for all CINCINNATI FILMATIC 4" to 14" L Plain Grinding Machines and 10" to 18" Universal Grinding Machines having between-center lengths up to 48" inclusive. Want more information? Ask for brochure G-687.



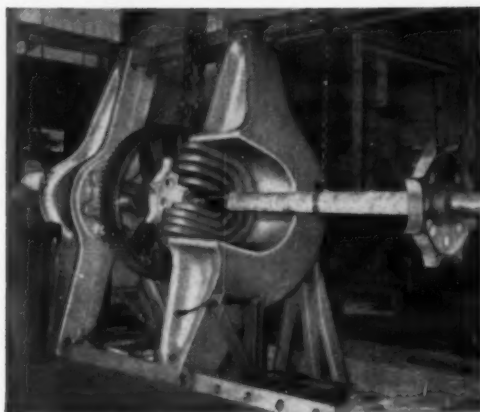
Gage-Line unit mounted on the bed of a CINCINNATI FILMATIC 18" x 48" Universal Grinding Machine. Detailed information on these fine precision grinders in catalog No. G-663-2.



GRINDING MACHINES • ROLL GRINDING MACHINES  
GRINDERS • CENTERLESS LAPPING MACHINES

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The Cincinnati Milling Machine Co.  
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# A MOUNTAIN *of* POWER



**POWER FOR BIG JOBS**—Here a Rodgers 600-Ton Inclined Forcing Press is forcing a large gear and sprocket from a mine machine shaft.

## —or a touch of pressure

The heavy machines and equipment used in the great iron mining industry present a variety of problems when repair or maintenance is necessary. For this work the accurately controlled action of Rodgers Hydraulic Forcing Presses is a real time and work saver.

A Rodgers Forcing Press puts a mountain of power at your fingertips to force wheels, sprockets or gears from their shafts and for straightening, assembling, swedging or upsetting jobs. Operators also use the versatility, speed, power and positive control of a Rodgers Forcing Press to efficiently perform small pressing and forcing jobs with just a touch of pressure—tasks once done only on vertical shop presses!

## you get both with RODGERS FORCING PRESSES

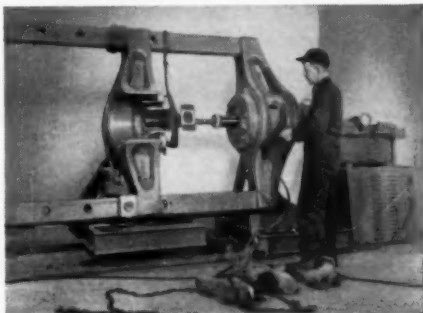
Rodgers vertical, horizontal and inclined forcing presses offer capacities from 100 to 600 tons . . . up to 9 feet between tension bars . . . up to 16 feet between ram and abutment . . . single or double acting cylinders with 13 or 26-inch ram travel (72-inch travel available) . . . electrically powered hydraulic pumps with selective, positive pressure adjustment and remote control . . . removable press cylinders that

can be used in special jacking or pulling jobs . . . and many more features that assure you of dependable, long life operation — all fully described in Rodgers Catalog Number 315A.



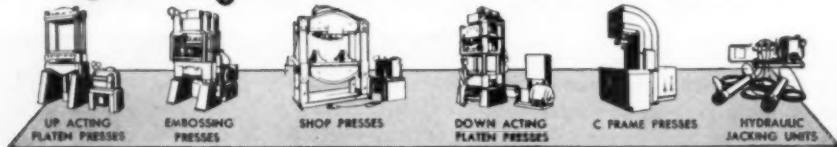
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## Rodgers Hydraulic Inc.

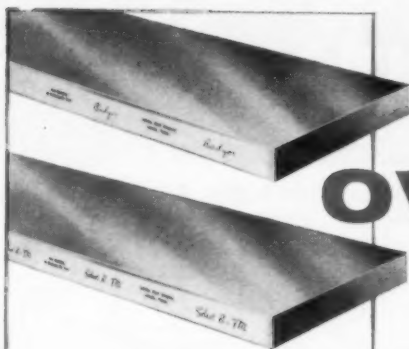


**LIGHT TOUCH FOR SMALL JOBS**—This Rodgers 300-Ton Inclined Forcing Press is used on small as well as large equipment repairs. Here, a pin is being pressed out of a tractor idler support bracket.

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**Flat Ground Die Stock**

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costs!

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*speeds die making!*

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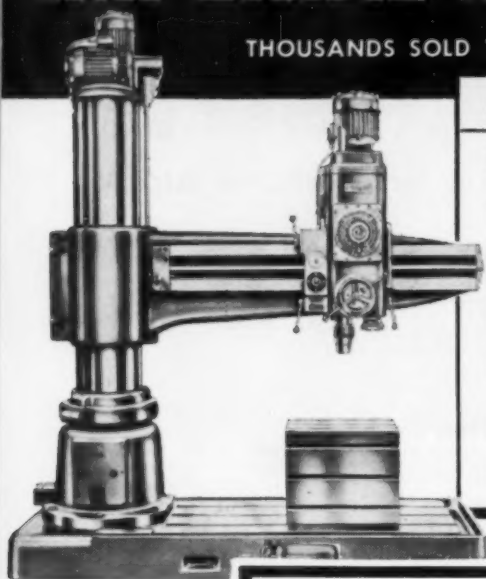
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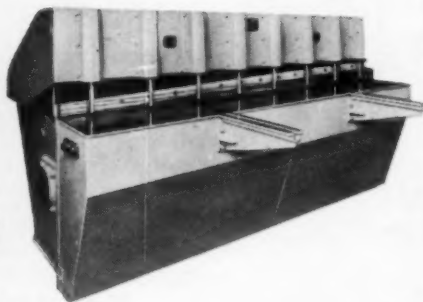
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L-3	8 1/4	3'	\$2195.
M-3PE	10	3'	\$3995.
M-4PE	12 3/8	4'	\$4985.
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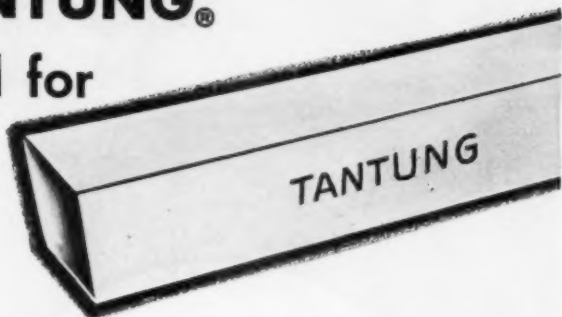
Length	Capacity	Price
6'	10 gauge	\$3595.
8'	12 gauge	\$4395.
10'	12 gauge	\$5195.
6'	3/16 inch	\$5190.
8'	10 gauge	\$5495.
10'	10 gauge	\$5795.
6'	7/32 inch	\$6190.
8'	3/16 inch	\$6495.
10'	3/16 inch	\$6795.

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between high speed  
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V-R TANTUNG bridges the gap between maximum cutting speeds of high speed steel and practical minimum speeds of cemented carbides . . . and it's easy to grind with aluminum oxide wheels.

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April, 1959

13



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**... be sure to use Blanchard Wheels**

Your Blanchard Surface Grinder is designed to give you peak production and economy on hundreds of different grinding jobs. But, for every job you run, *there's one particular wheel that does it best!* That's why Blanchard manufactures and stocks a wide variety of silicate, resinoid and vitrified bonded wheels and segments.

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May we send you a copy of "The Art of Blanchard Surface Grinding" (4th Edition)?

**THE BLANCHARD**

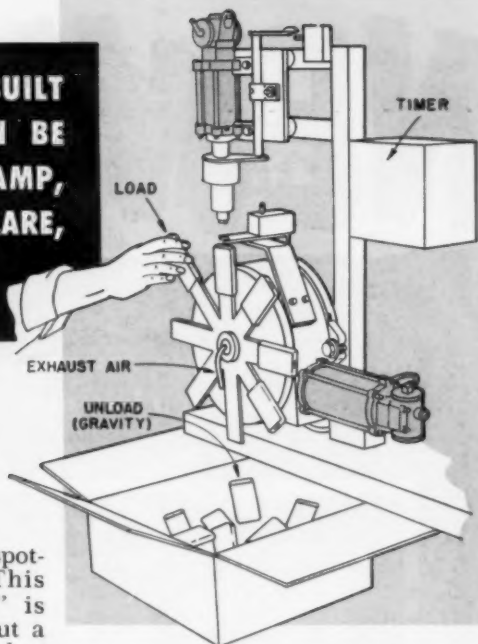


**MACHINE COMPANY**

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**THIS SIMPLE SHOP-BUILT  
"FERRIS-WHEEL" CAN BE  
USED TO PUNCH, STAMP,  
HEAT-SEAL...OR TO FLARE,  
FORM OR RIVET**



Here's another example how versatile Bellows "Controlled - Air - Power" Devices can be used to "spot-automate" operations. This "SPOT-A-MATION IDEA" is based on a setup used to cut a slot in a plastic key case, but the basic idea can be adapted to perform a host of operations in metal fabrication.

It's a simple, inexpensive device. A Bellows Rotary Feed Table, mounted vertically, feeds the part to the tool attached to the piston rod of the Bellows Air Motor. The two are electrically interlocked. Bellows Rotary Feed Tables can be provided to index

almost any number of positions. The unit can be equipped with a "timed dwell"; additional work stations can be set up to perform other operations on the same part; automatic feeding or ejecting devices could be installed.

Whatever you make, however you make it, Bellows "Controlled-Air-Power" Devices can help you make it at lower cost.

**THIS SPOT-A-MATION  
IDEA FILE IS  
YOURS ON REQUEST**

Complete wiring diagrams, installation data and equipment list on the "ferris-wheel" shown, and on a score of other applications where Bellows air-powered work units are used to convert existing equipment to lower cost operation. Write for it today. Address: Dept. MTB-459, The Bellows Co., Akron 9, Ohio.

1341-B

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DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

**AKRON 9, OHIO**

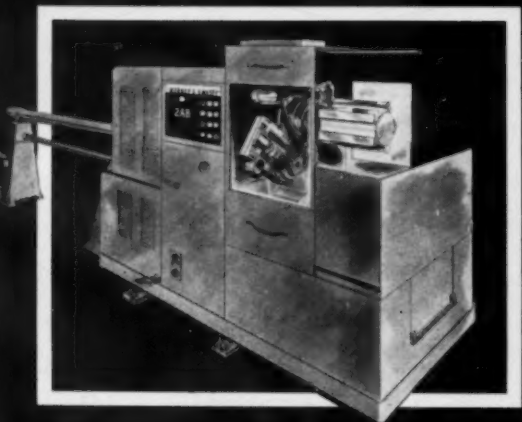
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# NEW!

## WARNER & SPINDLE

...enables profitable small-lot production of even your most complex and precision demanding bar jobs on a fast, automatic basis



**N**ow, the shop-proven, cost-cutting features which have made Warner & Swasey Automatic Chuckers so outstanding in their field are available in a new Single Spindle Bar Automatic. Most important among the profit-producing features of this new Warner & Swasey 2 AB are:

● **FASTER SETUPS**—With no cams to change, time-consuming setup procedures, usually encountered with automatic bar machines, are eliminated. Even your smallest lot bar jobs can now be produced on an automatic basis economically.

● **GREATER ACCURACY**—only two wide—and widely-spaced—bearing surfaces support the turret. Thus, cumulative tolerance problems in conventional "multi-

ple bearing" turret location designs are eliminated.

● **EASIER TOOLING FOR COMPLEX WORK**—Flexibility and accessibility of the 2 AB's cross slides and pentagon turret enable the use of a wide variety of machining methods. One operation usually handles even the most complex workpieces.

● **POWER FOR TOMORROW'S JOBS—TODAY**—The 2 AB's 25 horsepower, reversible motor more than meets today's rugged metal removing requirements and, coupled with a wide range of spindle speeds, permits the efficient application of the latest cutting tool materials.

● **"FREE" CUT-OFF TIME**—An independently-operated cut-off slide allows full utilization of both front and rear cross slides. The cut-off cycle may be started during



# SWASEY 2 AB SINGLE AUTOMATIC BAR MACHINE

This new 2 AB machine has a capacity of 3-inch diameter,  $9\frac{1}{2}$ " working stroke and a 6-speed transmission that allows two ranges of 6 automatically selected speeds: from 120-1544 RPM in High Range and 56-728 RPM in Low Range. Right or left-hand threads can be handled from 7 to 32 TPI.

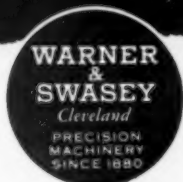


Sets up fast...like a turret lathe

any one of the pentagon turret stations. Thus, cut-off can be progressing during subsequent machining providing a cut-off cycle which is virtually "free".

● **AUTOMATIC RESTOCKING INDICATOR**—This ingenious device in the hydraulic bar feed mechanism automatically stops the 2 AB and lights an indicator light on the operator's control panel before the bar being machined runs out—prevents tool damage from improperly-gripped stock.

Why not call your nearest Warner & Swasey Field Representative and get the complete story on the new 2 AB. It can help increase both production and overall profits—so important in today's highly competitive picture.



NO MATTER WHICH WAY YOU TURN  
...WARNER & SWASEY CUTS COSTS

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# Symbols of Service

to all metal-working  
industries

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The Morse "house emblem" and the NIDA seal are *double warranty* of the best you can get in quality and service.

For Morse-Franchised Distributors are like the tools they sell . . . tested and proven on their jobs . . . men of experience and responsibility who know how to get you top value for every dollar you spend on cutting tools.

So call him in today . . . *your* Morse-Franchised Distributor. You'll find him more and more of a business asset, the longer you do business with him.

**MORSE TWIST DRILL & MACHINE COMPANY**  
**NEW BEDFORD, MASSACHUSETTS**

WAREHOUSES IN NEW YORK, CHICAGO, DETROIT, DALLAS, SAN FRANCISCO

A DIVISION OF VAN NORMAN INDUSTRIES, INC.



# Morse

CUTTING TOOLS



Now

# AUTOMATIC POSITIONING with the **DIXI 75**

horizontal optical-jig borer

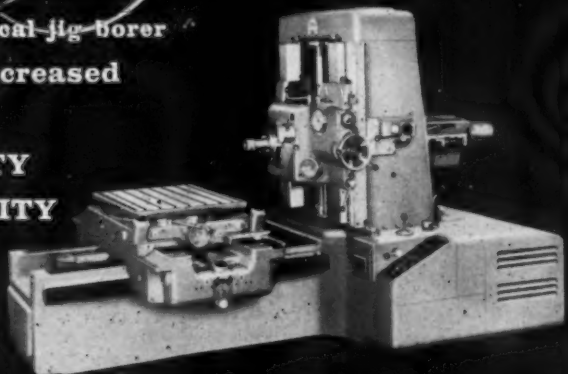
offers you increased

**ACCURACY**

**VERSATILITY**

**PRODUCTIVITY**

Made in Switzerland  
Measurement in inches



- Automatic positioning can be changed instantly to manual operation
- Projected optical setting—direct reading to .00005" for linear motions and 1 sec. of arc for built-in rotary table. Linear optics provided with adjustable zero reference
- Simplified controls functionally arranged for greater operating speed and efficiency
- 3" diameter boring spindle
- Increased capacity: table size  $39\frac{3}{8}" \times 32"$ ;  $29\frac{5}{8}"$  cross travel;  $23\frac{3}{8}"$  longitudinal travel;  $25\frac{5}{8}"$  vertical travel
- Hydraulic feeds and infinitely variable spindle speeds
- Rear support optional

**MBI has engineers available for consultation, guarantees service by factory trained staff, and stocks spare parts in New York.**

**Demonstrations upon request at our conveniently located demonstration centers.**

## **M. B. I. EXPORT & IMPORT LTD.**



A DIVISION OF MACHINERY BUILDERS, INC.

**475 Grand Concourse, Bronx 51, N. Y.**

**"Over 25 years' experience in designing and building machinery."**

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**22<sup>1</sup>/<sub>2</sub> hours per day...  
7 days a week...**

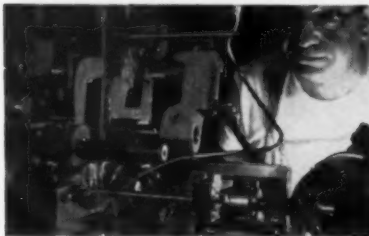


## **and no maintenance problems**

"We have encountered no maintenance problems," says a spokesman for a major New York appliance plant which has operated these 2 BAKER AUTOMATIC BAR MACHINES continuously since installation 6 months ago.

Change-over time has been cut from 16 hours to 4 hours. A separate

washing step and hand burring operation have also been eliminated. BAKER electronic speed control is another reason "... why we have ordered the third machine for use here ..." says this BAKER customer. For additional details, write to BAKER BROTHERS, INC., Dept. TB-459, 1000 POST STREET, TOLEDO 10, OHIO.



Each BAKER cuts, threads and burrs 720 Heater Motor Shafts per hour, eliminating the need for manual finishing steps.

**BAKER<sup>®</sup>**  
**AUTOMATIC**  
**BAR MACHINES**

STANDARD AND SPECIAL DRILLING AND TAPPING MACHINES • COMPRESSION HOLDING MACHINES

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## Discover

### The Broad, New Applications of TIME-SAVING, MODERN ABRASIVES!

Brightboy, the only complete stock line of rubber-bonded abrasives, will perform many types of work previously unrelated to abrasive uses. Replaces many older, costlier metal working methods. *Gives you a broad, new, refreshing concept of abrasive applications!* FAST, PROMPT DELIVERY FROM DISTRIBUTORS OR FACTORY STOCK.

Brightboy is a *different finishing medium*, which BURS, CLEANS, FINISHES, POLISHES, in a single-step, time-saving operation. Its unique working action results from rubber and Aluminum Oxide or Silicon Carbide

abrasive grains, working simultaneously. You have wide choice of stock grains and textures, grades extra fine to extra coarse, in soft, firm and tough rubber binders, JOB-MATCHED to your work. *No fuss. No muss.* Wheels, sticks, rods and blocks for machine and manual operations.

#### WRITE us NOW for:

- SAMPLE BRIGHTBOY HAND TABLET
- CATALOG LISTING GRAINS, TEXTURES, MACHINE SPEEDS
- NEW METHOD RECOMMENDATIONS and name of nearest Brightboy distributor

#### TIME SAVING FEATURES

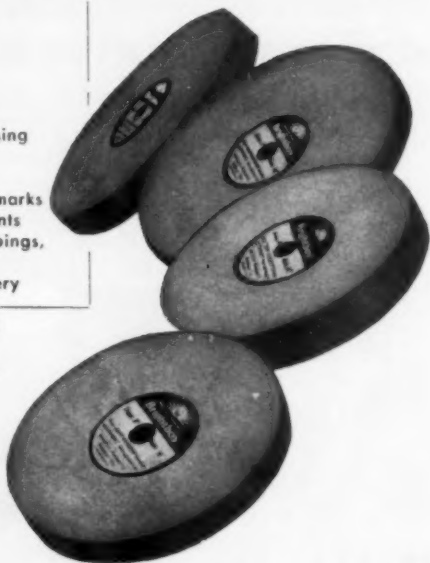
Works to close tolerances  
Can be shaped to contour  
Produces conventional and special finishes and patterns, frequently the final polish  
No before-use preparation or dressing  
No skilled labor required

#### GENERAL USES

Removing light digs, tool and heat marks  
Cleaning welded and soldered joints  
Burring and finishing castings, stampings, machined and molded parts  
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BRIGHTBOY INDUSTRIAL DIVISION  
WELDON ROBERTS RUBBER CO.  
95 North 13th Street Newark 7, N.J.

*America's Pioneer Manufacturer  
of Rubber-Bonded Abrasives*



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# INGENIOUS NEW... UNIVERSAL R&R DEBURRING TOOL



with spring loaded retractable blade  
eliminates chatter  
gives precision-cut edge or  
chamfer at high speed



The cutting action of Model 955 Universal R&R chatterless Deburring Tool (on the left) is effected by spring tension against the blade. On Model 956, right, the spring tension is against the body. This is adjustable to regulate the depth of cut. The blade is free-floating to allow self-alignment and uniform stock removal.



The new Universal R&R Tool makes a handy horizontal deburrer when used with a portable drill held in a vise. With proper adjustment, the R&R Deburring Tool is CHATTERLESS. A new design allows the bearing angle of the tool body and the blade to be in continuous contact with the work piece at all times.



R&R Deburring Tool used in electric drill as a portable unit for heavy plate or other objects too heavy to handle. Blades of the R&R Deburring Tool are replaceable at nominal cost from stock. They are made of high speed steel, precision hardened and ground to close tolerances for interchangeability.



Used in any standard drill press at the high operating speeds recommended by the makers of high speed steels, the R&R Deburring Tool performs most efficiently. High operating speeds mean more production, lower costs. Each tool is made in a full range of sizes to 1 1/2" diameter.

**UNIVERSAL ENGINEERING COMPANY**

209

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April, 1959

FRANKENMUTH 10,  
MICHIGAN

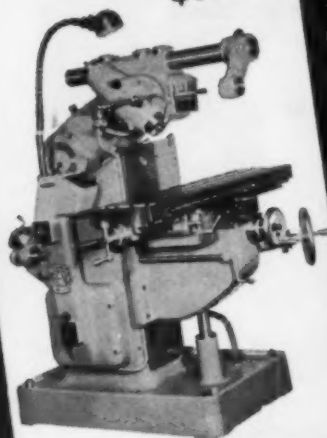
23



# Exceptional Values! Available from stock! PRECISION MILLING MACHINES

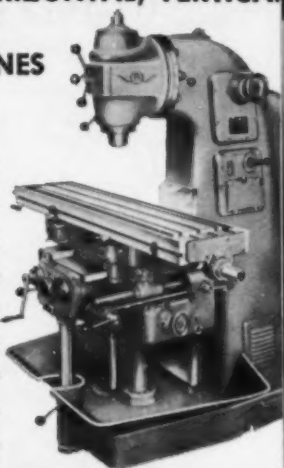
THOUSANDS SOLD TO SATISFIED CUSTOMERS!

**ABENE**  
VERTICAL HORIZONTAL  
MILLING MACHINE  
**\$3990.**



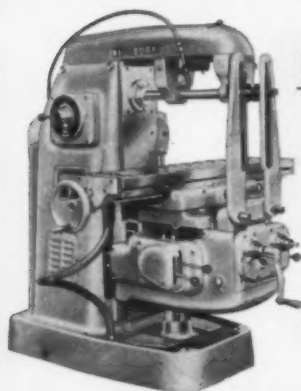
## **PEDERSEN HORIZONTAL, VERTICAL and combination MILLING MACHINES**

Model	Table Size in Inches	Base Price
VPF-00	35½x8½	\$1663.
VPV-00	35½x8½	\$2463.
VPU-0	39½x9½	\$2890.
VPU-1	51x12	\$3260.
VPV-1	51x12	\$3760.
VPF-2	61x12	\$6185.
VPU-2	61x2	\$6285.
VPV-2	61x12	\$6885.
VPF-4	75x16	\$12850.



LIBERAL TERMS • RENTALS

## **WESTBURY Universal Dial-Type Horizontal Milling Machines**



Model	Table Size in inches	Base Price
1U	40x10	\$3390.
2U	51¾x10¾	\$5265.
3U	60x12¼	\$6275.
1-S	42x9	\$1690.
Contour	42x9	\$3190.

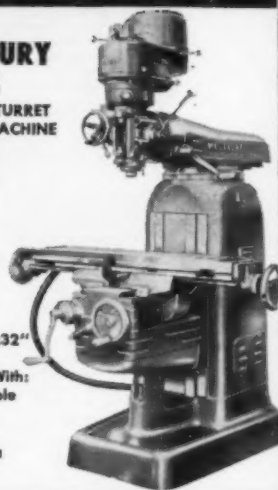
AGENTS WANTED

## **WESTBURY**

### **I-S VERTICAL TURRET MILLING MACHINE \$1595**

Incl. Motor  
& Controls

½ H.P. 9"x32"  
Table  
Available With:  
9"x42" Table  
\$95. extra  
Coolant  
\$155. extra



# **AARON MACHINERY CO., Inc.**

DEPT. B 45 CROSBY ST., N. Y. 12 • WA 5-8300

BRANCHES AT:  
BUFFALO, N. Y. RICHMOND, CAL.  
MINEOLA, N. Y. LOS ANGELES, CAL.  
HOUSTON, TEXAS TULSA, OKLAHOMA  
SEE OTHER AD PAGE — 12



**NOW!**  
**GREATER**  
**PRECISION...**  
**PRODUCTION...**  
**ECONOMY...**  
 with

## BOYAR-SCHULTZ 6x18 SURFACE GRINDERS

*Available in Hydraulic and Hand Feed models.*

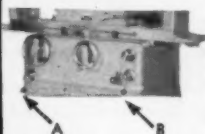
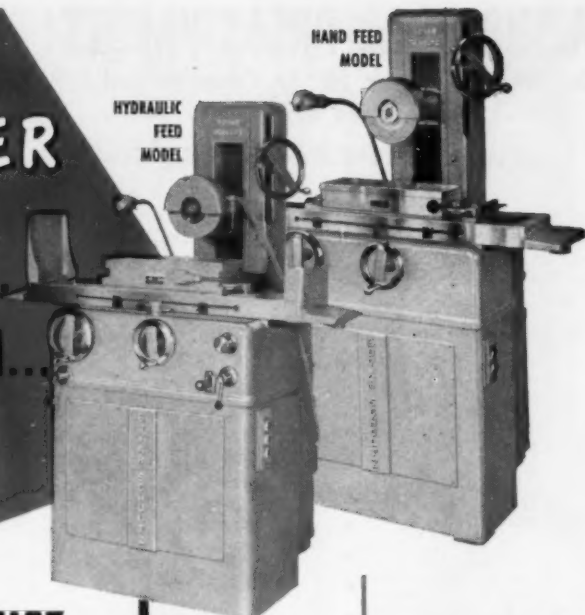
These machine tools are of the most advance design, fully proved and enthusiastically endorsed by users who must have accuracy as well as production performance.

Exclusive features include heavy duty precision spindle; vertical column assembly supported by horizontal cylindrical ways; closely grained nickel alloy table with longitudinal ways of hardened and ground tool steel; vertical feed assembly with precision ground worm gear perfectly fitted to bronze gear for easy operation.

*Write, wire or call.  
 We'll be glad to  
 SHOW you what this  
 fine grinder will do.*

**BOYAR-SCHULTZ  
 CORPORATION**

Use postpaid card. Circle No. 220



Hydraulic operation is accomplished by controls A and B above. These controls automatically disengage longitudinal and cross feed hand wheels.

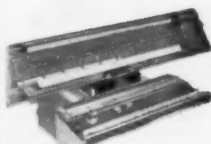


Table ways, one V and one flat are ground and hand scraped. They travel on hardened and ground tool steel ways.



Precision screw on vertical feed assembly turns through a perfectly fitted steel worm and bronze gear, operating in grease packed, sealed gear box.



Unique column assembly combines vertical and cross feed travel. Study vertical column has oversize bearing surfaces. Hardened and ground cylindrical ways provide accurate long wearing surface for cross feed travel.

# Now Boice-Crane Brings You AMAZING DRILL PRESS VALUES!

An 18" Which Rivals a 20" in Capacity and H.P.  
at the Price of a 17"

## 24" Hand or Power Feed Models Offering Equally Sensational Value

You buy Scotch from Scotland, optical goods from Germany, perfume from France, lace from Ireland, and woollens from England because you consider them superior.

Now get the fine unhurried workmanship of Swedish machinery, in drill presses made especially for Boice-Crane, U.S.A.

## FIRST IN MEDIUM SIZES WITH POWERFUL GEAR-DRIVES AND GEAR SHIFT SPEED SELECTION



### NO UNHANDY GUARDS • NO PULLEYS OR BELTS • NO BELT CHANGING

Instant speed selection is by gear shift on 4-speed models, supplemented by 2-speed motors on 8-speed models. Reversing switch for tapping is standard on 24-inch, optional on 18-inch. Feed speeds: (power feed only .004" and .007".

**SPINDLE - QUILL - COLUMN** Stocky, oversized and super accurate spindle contains No. 3 MT socket WITHIN IT and BETWEEN bearings, not just a No. 2 protruding BELOW the bottom bearing. All bearings SKF, the bottom-most a roller type for heavier thrust and radial loads. Columns 4" dia. on 18"; 4-5/16" on 24" hand feed; 5" on 24" power feed model. All quills 2-3/8". Head raiser and table raiser are standard.

**UNBELIEVABLY LOW PRICES!**  
18-inch, 1" cap. (cast iron) complete **Just \$369.50!**  
with motor \*

\*3-phase with plain table.

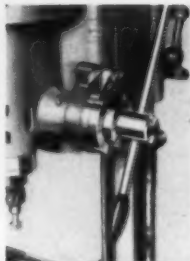
24-inch, 1 1/4" cap. (cast iron)

Power Feed — 1 1/2 H.P. 2-speed Motor, Only 795.00\*\*

(As shown ready to run)

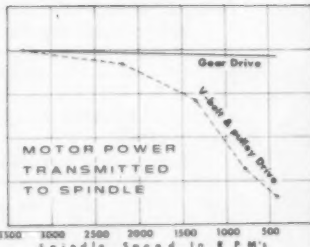
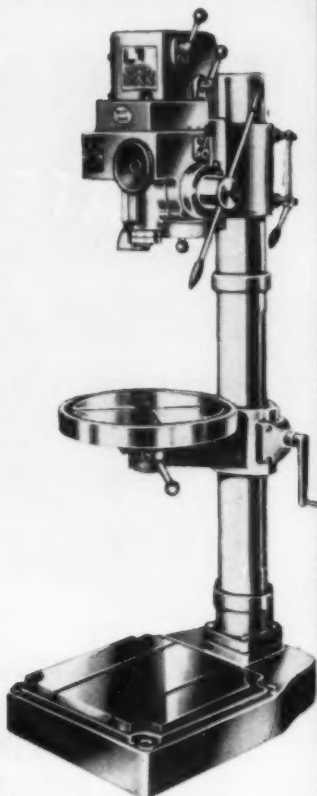
\*\*\$575.00 hand feed only.

**FULLY GUARANTEED**—Inspection ticket certifies in .000's and .0000's the built in accuracy and critical alignments.



### EXCLUSIVE & NEW! POSITIVE, MULTIPLE AUTOMATIC DEPTH CONTROL

provides 3 stops for hand-feed step or interrupted stroke drilling and counterboring.



**POSITIVE ALL-GEAR DRIVE—MORE POWER THAN V-BELTS.** Fully enclosed precision steel and fiber gears, 9 to ball bearings. 1 H.P. geared drive motor 1 H.P. at ALL speeds. Contrast with terrific power losses of V-belts and shear at the low spindle speeds best suited large twist drills.

**REPLACEMENT PARTS STOCKED TO MEET ALL FUTURE DEMAND**

Write Today for Additional Information.

# BOICE-CRANE COMPANY

936 W. Central Avenue

Use postpaid card. Circle No. 221

Toledo 6, OH

**"ARMED" For MORE  
VERSATILE  
WORK!**

## **NEW GREAVES TOOLMAKERS OVERARM**

Here's the way to add new "firepower" to toolroom milling operations! Install in your toolroom a GREAVES MILL equipped with this new Toolmakers Overarm.

You'll discover new versatility for milling intricate jig and fixture work, for keywaying, slotting and angular milling. Two graduated swivels permit mounting the spindle head in almost any angle for milling, drilling, spot facing and related operations.

Powered by an independent 2 HP motor, the unit is driven through helical gears. Eight speeds may be selected with convenient controls operating speed change clutches. A hand-fed quill attachment provides 4" tool travel to the spindle. Arbor support fits overarm, permits arbor type milling without changing overarm.

*Write for Complete Specifications and Prices*

**GREAVES MACHINE TOOL DIVISION  
J. A. FAY & EGAN COMPANY  
2600 Eastern Avenue, Cincinnati 2, Ohio**

- Swivels permit any angular setting of spindle head.
- 2 HP independent motor drive.
- 8 speeds from 175 to 1750 RPM.
- Quill has 4" hand feed.
- Spindle equipped with No. 50 N. S. taper; reduced to No. 2 Morse taper when Quill Attachment is used.
- Gears run in oil bath.
- Full vision oil level gauge.

**RACK FEED.** The overarm is equipped with rack feed for positioning over work.

Manufacturers of  
**GREAVES MILLS**  
"the MOST Mill for  
the LEAST Money!"

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This 24-ft. boring mill is facing a disc of 300 stainless . . . a difficult machining operation . . . but this 3-man team quickly found the answer.

## This 3-Man Team makes expensive machines pay off

Every time some new alloy must be machined, new problems arise as to the best tool, grade of carbide, feeds, speeds and depth of cut to use. Modern mills and machines are too costly to permit a lot of experimenting with resultant downtime.

The only sure and economical way is by pooling the know-how of a 3-man "tooling team." The Tool Engineer knows the job requirements; the Machine Operator contributes his machining skill; and your Kennametal Carbide Engineer provides information on the latest developments in carbide tooling.

Such a 3-man team can best determine the proper tools required for the job . . . then fill those requirements from the extensive line of Kennametal\* tooling. Spearheaded by the Kcndex\*

(patented) line of "throw-away" insert tooling with more than 50 standard styles, plus many adaptations for special needs, Kennametal offers a selection that will provide the right tool for every job . . . for every shop, whether large or small.

Call in your Kennametal Carbide Engineer today to help you get the best tooling for every machine and material . . . applying Kennametal and helping to solve tough machining problems is his full-time job. Or write KENNAMETAL INC., Latrobe, Pennsylvania.

\*Trademark

5779



INDUSTRY AND  
**KENNA METAL**  
*... Partners in Progress*



PRECISION MACHINE PRODUCTS

The Cleveland Automatic Machine Company  
4932 Beech Street  
Cincinnati 12, Ohio  
Attention: Mr. John Prohaska.

Gentlemen:

Our experience with our Cleveland 3" AB Automatic has been most gratifying. Its great versatility and accuracy as a chucker as well as a bar machine, coupled with its ease of set-up, due primarily to the use of universal cams and infinitely variable electronic feeds, and its low cost of maintenance has contributed greatly toward keeping our prices competitive and our quality high.

Because of its ease of set-up, we have used this machine to advantage on short runs of as few as 200 pieces as well as long runs of several thousand pieces.

Needless to say, we are extremely happy with our choice.

Very truly yours,  
VEE-ARC CORPORATION

*Aram Kalenian*  
Aram Kalenian,  
President.



Aram Kalenian, writer of the letter reproduced above, and president of Vee-Arc Corp., is shown with Ralph Rastad, superintendent, and Paul Daoust, operator, examining a chucking job run on their 3" Model AB Cleveland Dialmatic.

## WHAT THE CLEVELAND DIALMATIC DOES FOR VEE-ARC...

### IT CAN DO FOR YOU!



The parts shown (some are blanked out, others are machined complete) are typical of those produced on the Model AB 3" Cleveland Single Spindle Automatic at the Vee-Arc Corp. Diameters of these parts range from  $\frac{1}{8}$ " to  $\frac{1}{4}$ ", and materials include aluminum, type 303 stainless, and tough, cold hobbing steel.

By making use of the Cleveland's chucking attachment, which is quickly substituted for the bar stock feed assembly, the part shown at right is machined from blanks of  $\frac{1}{4}$ " round aluminum bar stock in 95 seconds cycle time.

What the Cleveland Dialmatic does for Vee-Arc, it can do for you! Choose Clelands to increase the production efficiency in your plant.

## THE CLEVELAND AUTOMATIC MACHINE COMPANY

4930 Beech Street  
Cincinnati 12, Ohio

SALES OFFICES: CHICAGO  
CLEVELAND • DETROIT  
HARTFORD • S. ORANGE

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines  
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FOR **BIG, HEAVY DUTY** **PRECISION SPINDLES**

that produce **BIG** savings in production cost

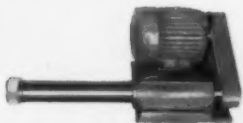
**SPECIFY POPE**



**POPE P-18670 Heavy Duty, High Speed Milling Spindle**, 4 ft. long, 10 in. dia.; weight about 1000 lbs.



**POPE P-18842 Deep Hole Internal Grinding Spindle**, 10 HP, 7 ft. long, 12 in. dia. barrel; weight 4000 lbs.



**POPE P-5794B Motorized Deep Hole Grinding Spindle**, 10 HP, 36 in. long, 6 in. dia. barrel, for use in horizontal or vertical position on boring mills or planers; weight about 800 lbs.



**POPE P-18844 Vertical Bearing Grinder Spindle**, 20 HP, 6 ft. long, 12 in. dia. barrel; weight approx. 4000 lbs.



**POPE P-1098 Heavy Duty Internal and External Grinding Spindle**, 50 HP, for wheel of 30 in. dia. and 12 in. width; weight approx. 6000 lbs.



**POPE P-10009E Motorized Deep Hole Grinding Spindle**, 5 HP, 36 in. long, 3 in. dia. barrel; weight 600 lbs.



**POPE P-1076 Cylindrical Grinding Spindle**, designed for crush dressing and form grinding; 5 ft. long, 10 in. dia. barrel, for 24 in. dia.; 4 in. wide wheel; weight about 1250 lbs.



**POPE P-A1 Deep Hole, Ram Type Grinding Spindle** attached to boring machine, 10 HP, 10 ft. long, 10 in. dia. barrel; weight 2000 lbs. (For purposes of comparison, a Pope P-32 6" x 18" Surface Grinder Spindle is shown in the foreground.)

*Send us your specifications and get prompt quotations on the one best Spindle for your work, out of the 20,000 different Precision Spindles that bear the name "POPE".*

**No. 125**

**POPE®**

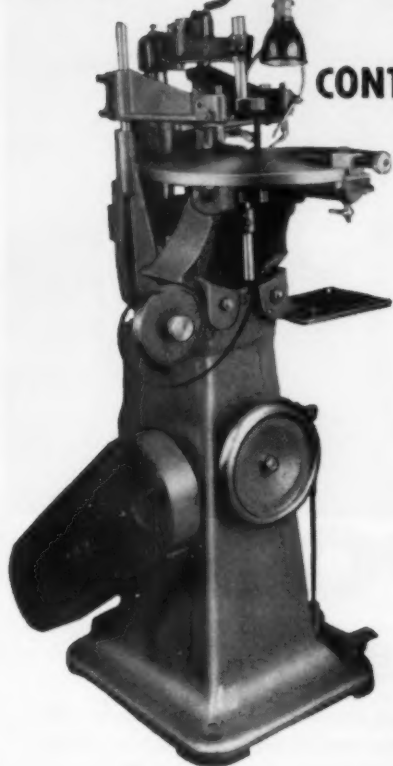
**ENGINEERS AND BUILDS STANDARD AND SPECIAL PRECISION ANTI-FRICTION BEARING SPINDLES FOR EVERY PURPOSE**

**POPE MACHINERY CORPORATION • 261 RIVER STREET • HAVERHILL, MASS.**

*Established 1920*

Use postpaid card. Circle No. 225

# *Save Hours* in tool rooms and die shops with **CONTOUR SAWING AND FILING**



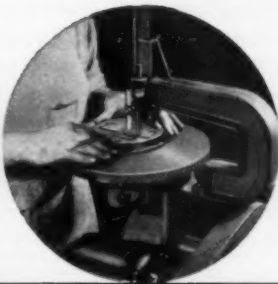
You can save real time and money in the production of parts for jigs and fixtures, dies, gages, templates and special machine production by using an Oliver of Adrian contour sawing and filing machine.

The Oliver is so simple to operate that all sawing, filing and lapping can be handled by an ordinary mechanic—saving a skilled die maker's costly time. Parts can be shaped to dimension faster, more accurately with no hand filing or semi-finishing operations. Available in five types — bench or pedestal. Write today.

**OLIVER of ADRIAN**

**OLIVER INSTRUMENT COMPANY**

1408 E. Maumee St. • Adrian, Michigan



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Get the  
**SOLID POWER**  
of a Remington drill

Chips fly when Remington power tools bite into steel. They're tough to wear out, too, because of the solid way Remington builds them. Remington manufactures a broad and versatile line. In drills alone, choose from 21 electric-powered or 11 air-powered models. Each is serviced for parts or repairs from a nationwide network of Remington Service Stations. It makes sense any way you look at it to specify Remington for all your portable power tool needs. Write for free descriptive catalogs—there's no obligation.

CHOOSE THE POWER MOST  
EFFICIENT FOR YOU. REMINGTON  
POWER TOOLS ARE AVAILABLE IN  
**AIR • ELECTRIC • GASOLINE  
AND POWDER-ACTUATED  
MODELS**

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CIMCOOL PRESENTS . . .

# CIMPERIAL




Here is what we believe to be the most advanced, the most effective cutting fluid in the history of the industry.


CIMPERIAL is an entirely new chemical concentrate especially designed for heavy duty applications. It is the only water-miscible fluid capable of performing the tough, low clearance, low speed operations previously limited to cutting oils.


CIMPERIAL is a chemical solution—not an emulsion—which effectively covers 95% of all metal cutting jobs.

CIMPERIAL increases tool life because it defeats both heat and pressure. Forming a chemical solution in water, CIMPERIAL rapidly dissipates heat. Won't "hold" the heat as an oil will. CIMPERIAL contains newly discovered EP (Extreme Pressure) additives which give you more cutting action with less force. Result: *production equal to, or better than, oil; and working conditions vastly improved.*

## Note these important advantages:

 **CIMPERIAL lasts longer.** It won't turn rancid: it contains no food for bacteria and has a remarkable bactericide to control those bacteria that do enter the mix from outside sources. No more Monday morning odor. Less frequent coolant changes mean lower costs, less down time for machines.

 **CIMPERIAL is productive and clean.** The new EP chemicals reduce the cutting forces and friction on the tool: in one case CIMPERIAL has already increased tool life 70%. It also has high film strength for lubricity characteristics better than oil. And there is no smoke or vapor around your machines.

 **CIMPERIAL controls rust.** You get two types of chemical rust inhibitors in CIMPERIAL . . . which form both *polar* and *passivating* films over metal surfaces. This gives you, even at lean dilutions, double protection against corrosion.



FOR 100% OF ALL METAL CUTTING JOBS

*Production-proved products of The Cincinnati Milling Machine Co.*

**CIMPERIAL**—newest in the famous, industry-proven line of CIMCOOL® Cutting Fluids!  
**CIMCOOL 52 Concentrate**—The pink fluid which covers 85% of all metal cutting jobs.  
**CIMPLUS**—The transparent grinding fluid which provides exceptional rust control.  
**CIMCUT Concentrates (AA, NC, 55)**—For every job requiring an oil-base cutting fluid.  
**ALSO**—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on great new CIMPERIAL and the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor today. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

\*Trade Mark Reg. U. S. Pat. Off.

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the



## of SHORT RUN SHEET METAL PRODUCTION



**A TEMPLATE MAKING**  
with the WIEDEMANN COORDINATOR



**B TEMPLATE INSPECTION**  
with the WIEDEMANN INSPECTOR

From producing precision templates . . . to fast accurate hole inspection . . . to high speed production of panels, chassis and other pierced parts, you can do the entire job in 60% to 90% less time with the Wiedemann Team—Coordinator, Inspector and Turret Punch Press.

Layout and setup are completely eliminated. Template holes are located on the Coordinator to X and Y dimensions using optical scanners, and drilled in rapid sequence. To assure optimum accuracy, template hole locations can be checked quickly on the Wiedemann Inspector. Then, working to the template, parts are pierced at amazing speed—30 to 100 holes a minute—with a Wiedemann Turret Punch Press. Complete flexibility of hole size, shape and location is assured. Even extensive engineering changes can be made on-the-spot at minimum cost.

Job shops and manufacturers alike are discovering the profitable difference the Wiedemann Team makes. Write today for full information.



**C HIGH SPEED PIERCING**  
with the WIEDEMANN RA-41P  
TURRET PUNCH PRESS

**SAVE 60%-90%  
ON YOUR WORK**

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the **IMPROVED AISI-01**

flat ground die steel



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Combining the **MOST WANTED ANALYSIS**

... with the **MOST NEEDED FEATURES!**

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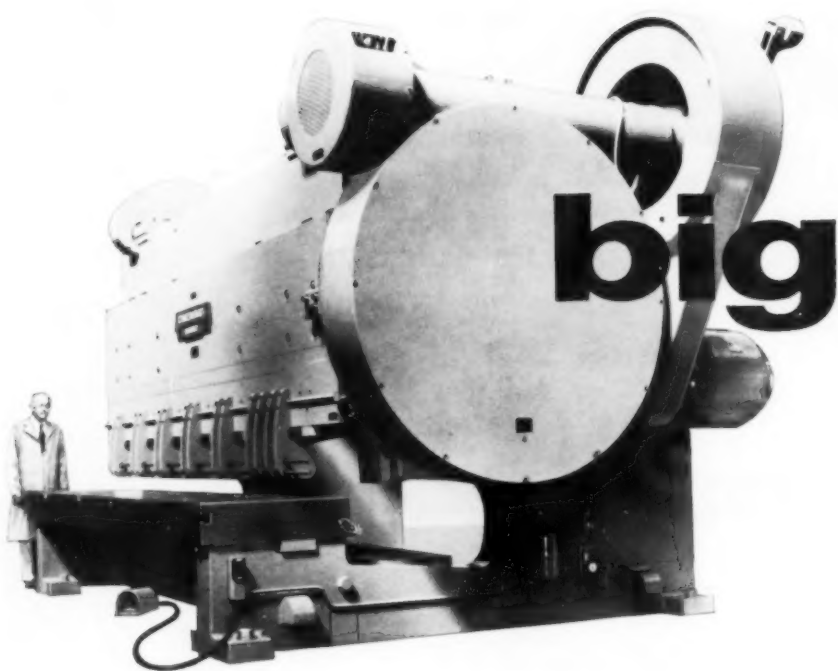
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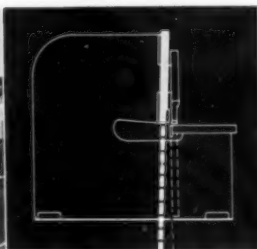
Typical Cincinnati® Shears: **big** series 15012, capacity  $1\frac{1}{2}$ ", 12'; **small** series 1004, capacity  $\frac{3}{16}$ ", 4'; **in between** series 1810, capacity  $\frac{1}{4}$ ", 10'.



All steel, interlocked construction—no welds used as load supports



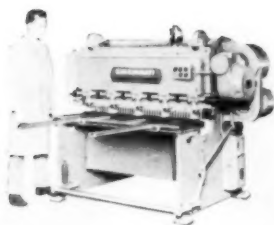
Hydraulic holddowns exert tons of pressure, insure accuracy



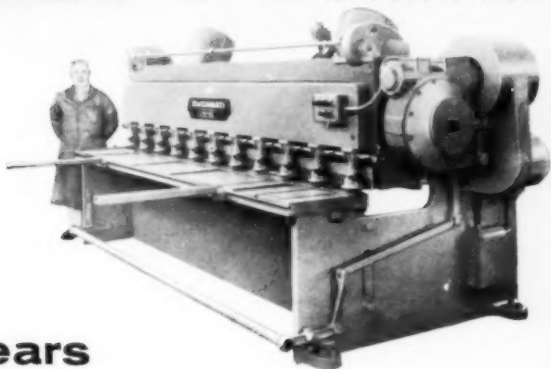
Non-float inclined ram maintains extremely accurate knife clearance



Front controlled power bag gage is standard, accurate



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**"More Use Per Dollar"**

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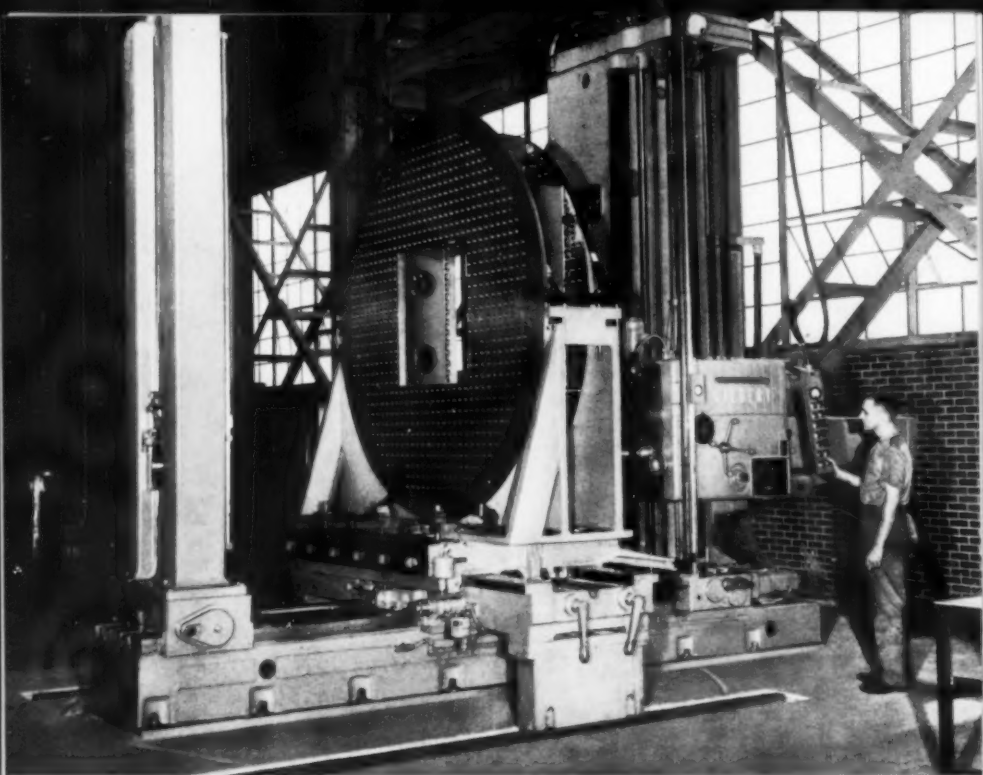
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These are some of the machining requirements on this part for a fast breeder reactor built in the Chattanooga plant of Combustion Engineering, Inc., pioneer manufacturer in the nuclear field. They are typical of

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*E-2FB	.165"—.390"
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Precision ball bearing workhead (B) mounted on combining slide for setting cutter to correct position when grinding and cutting flutes and radii. Other type workheads available.

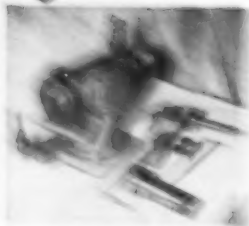
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CUTTER  
GRINDING  
FIXTURE

Radial Grinding Attachment (D) combines with Unit TA for sharpening end mills with square, conical, or ball nose shapes.

UNIT TA, Universal Cutter Grinding Fixture fits any universal tool or surface grinder.

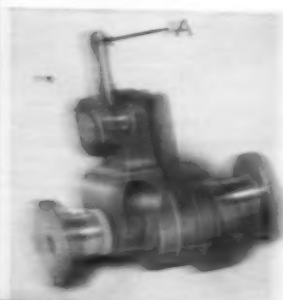


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**Notch & Merryweather's**

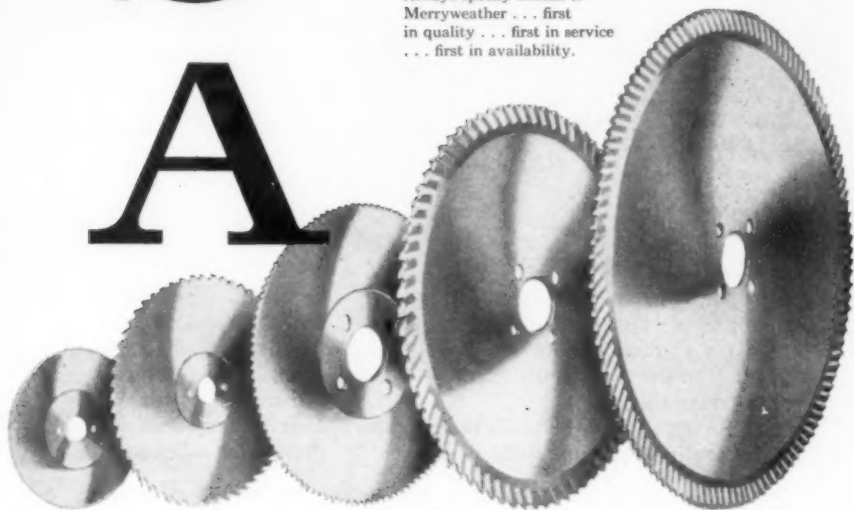
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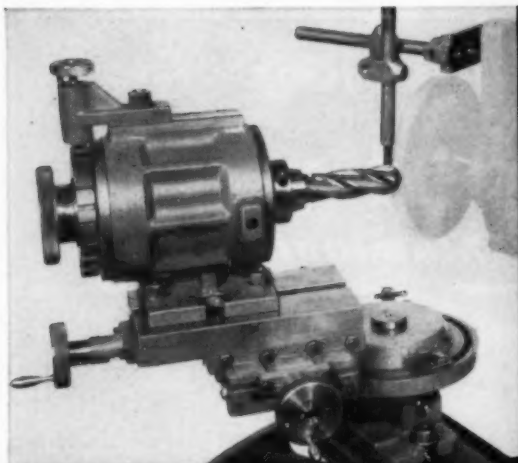


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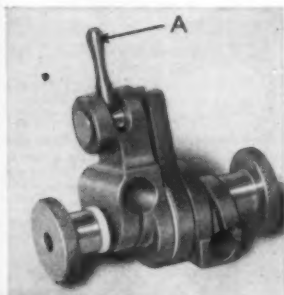


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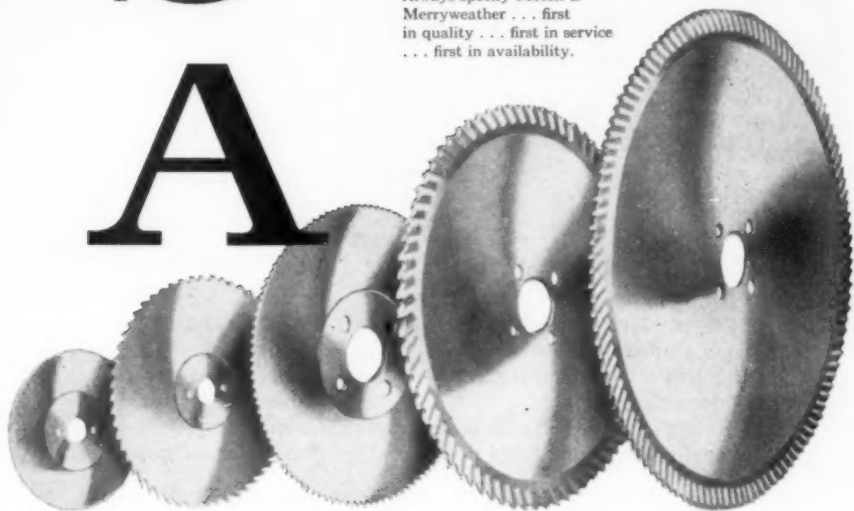
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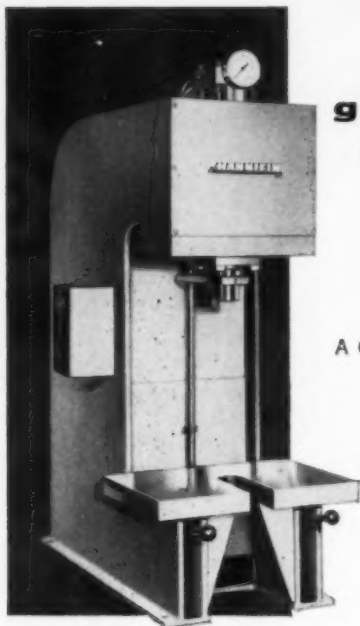
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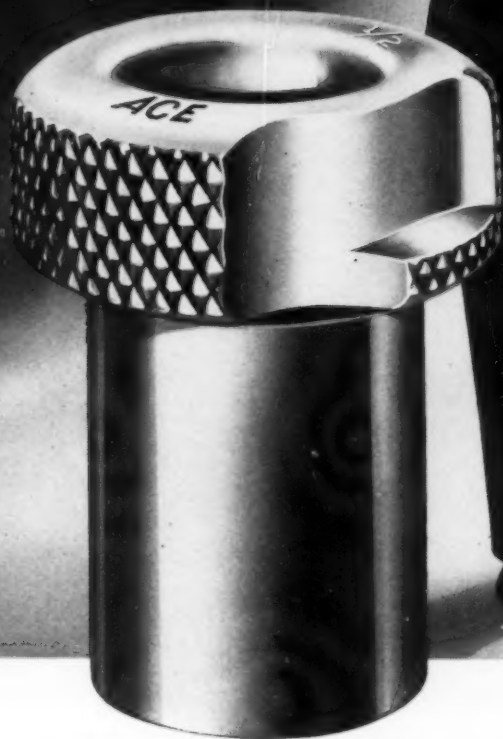
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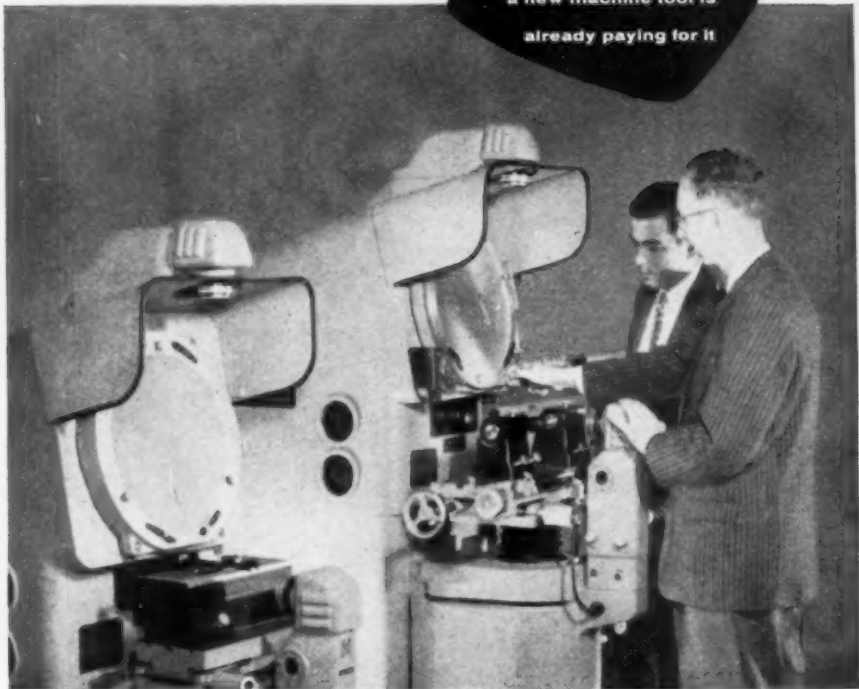


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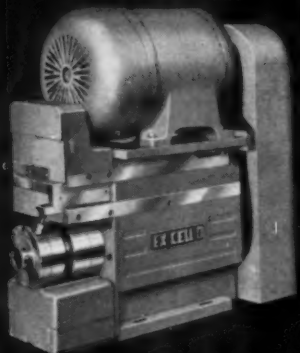
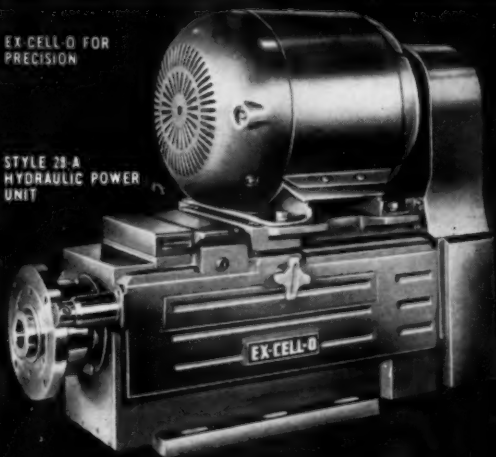


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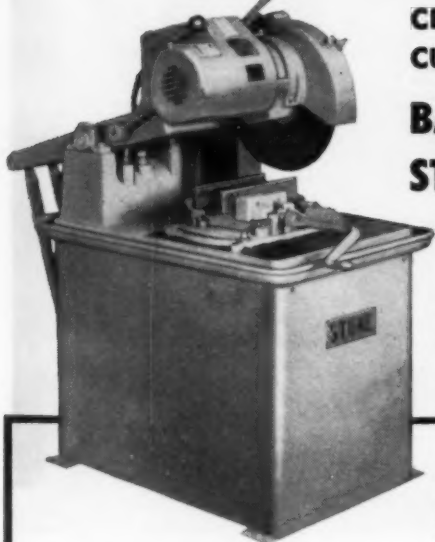
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There has never been such a combination of plus features to keep workers' hands healthy—and therefore on the job day after day!

It's a brand new scientific formulation — non-depleting Lan-O-Kleen *PLUS*.

It's WEST'S famous Lan-O-Kleen handcleaner plus a softer scrubbing action plus a gentler sudsing action ... plus a soothing lanolin action!

All of which combine to combat the depletion of natural skin oils while hands are being washed clean.

Highly important is the exclusive process that keeps the rich lanolin content of Lan-O-Kleen *PLUS* "free" to soothe and soften. Lanolin is impregnated into a corn meal base, instead of being "held" in the soap by conventional methods. In this way, it is instantly released for more positive, beneficial action.

Lan-O-Kleen *PLUS* is dispensed from a patented, precision-action unit. A clog-proof measuring valve with a mechanical agitator delivers a thrifty, yet adequate individual portion. More than 435 pairs of hands can be washed with each dispenser filling.

**FREE TRIAL OFFER.** We'd be glad to send five pounds of Lan-O-Kleen *PLUS* and loan a dispenser for free trial. Or we'll send a smaller sample for evaluation. Just call your local WEST office. Or mail the coupon to our Long Island City Headquarters, Dept. 18.

- ☐ Supply a dispenser and 5 lbs. of Lan-O-Kleen *PLUS*.  
☐ Send a small sample of Lan-O-Kleen *PLUS*.

Name \_\_\_\_\_

Position \_\_\_\_\_

PROGRAMS AND SPECIALTIES  
FOR PROTECTIVE SANITATION  
AND PREVENTIVE MAINTENANCE



WEST DISINFECTING DIVISION

WEST CHEMICAL PRODUCTS INC.  
42 16 West Street, Long Island City 1, New York  
Branches in principal cities  
CANADA: 5621-23 Casgrain Avenue, Montreal

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# Allison-Campbell

## ABRASIVE CUTTING KNOW-HOW

ACCO  
for Better  
Values



## Oscillation Improves Abrasive Cutting 4 Ways

On an oscillating-type abrasive cut-off machine, the cutting wheel is rocked back and forth across the cut while the wheel is fed downward. This horizontal movement produces some remarkable results.

**1 Greater cutting capacity** is one big advantage of oscillation. Because oscillation reduces the arc of contact between the wheel and the work, it is possible to cut solid steel bars up to 12" square. Without oscillation, 2" to 3" would be the practicable limit.

**2 Faster cutting** is another benefit of oscillation. Because the reduced arc of contact offers less resistance to the cutting wheel on large sections, the same wheel cuts faster, straighter, and with less feed pressure. Cutting rates of 4 to 8 seconds per square inch are maintained on even the largest cross-sections.

**3 Better quality cuts** are obtained with oscillation. Less heat is generated because of the small arc of contact, and the rocking action permits coolant to enter the cut more easily and prevent any heat build-up.

Burr-free cuts are produced with negligible burr, and there is little or no need for further finishing.

**4 Longer wheel life** is an important economy factor. The lower cutting temperature resulting from oscillation adds extra cuts to the life of every wheel.

The better flow of coolant within the cut washes away metal chips and loose abrasive, helping wheel efficiency.

### HOW ALLISON-CAMPBELL CAN HELP

A complete selection of machines and wheels for any cut-off application is offered by ALLISON-CAMPBELL. Four types of CAMPBELL machines—chop stroke, oscillating, horizontal, and rotary—in capacities from the smallest stock to 14" rounds . . . billets up to 12" square . . . plate up to 6" thick and 20 ft. long. ALLISON wheels—more than 150 different specifications—rubber or resinoid bond—3" to 34" diameters—.006" to 3/16" thick.

Expert recommendations from your ALLISON-CAMPBELL Field Engineer can solve your cut-off problems for you. He'll be glad to show you how to get the faster, cleaner cuts you can expect from modern abrasive cutting techniques. Ask him.

### WRITE FOR NEW BULLETIN

• Individual analysis of your cutting problems can be made in the new ALLISON-CAMPBELL Demonstration Laboratory. Write for a copy of DH-20, a new bulletin which describes how you can use these facilities. Complete details on ALLISON wheels and CAMPBELL machines are also available.

**ALLISON-CAMPBELL DIVISION  
AMERICAN CHAIN & CABLE**

937 Connecticut Avenue, Bridgeport 2, Conn.



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MACHINE and TOOL BLUE BOOK

MISSILE MANUFACTURER

% savings in time . . .

SPECIAL EQUIPMENT MANUFACTURER

Production

ECO

cell

MAKING

5.92 p

MACHINE TOOL BUILDER

% time saved . . .

MACHINING SUBCONTRACTOR

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AIRCRAFT SUBCONTRACTOR

lps make deliveries and money..

BOAT BUILDER

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ELECTRONICS MANUFACTURER

roduction increased 200%

rn is 90° COPYMATIC Lathes with 4-Way Power Rapid Traverse,  
(and extra), 45° COPYMATIC and Powershift Preselector  
Jstock also available.

**FOUNDRY EQUIPMENT MAKER**  
Above \$4000 yearly savings...

excellent accuracy, duplicating to  
less than .001" . . . clean front and  
ease of conversion to regular or  
Copymatic operation are outstanding  
. . . removing 15 to 30% more metal  
than our best (lathes) — twice that  
of some.

## HOW TO JUSTIFY YOUR LATHE REPLACEMENT

LOOK AT  
LODGE & SHIPLEY  
FIRST!

More production at lower cost is the answer to constant upward pressure on prices. Savings proved in Lodge & Shipley case histories\* show the wisdom of

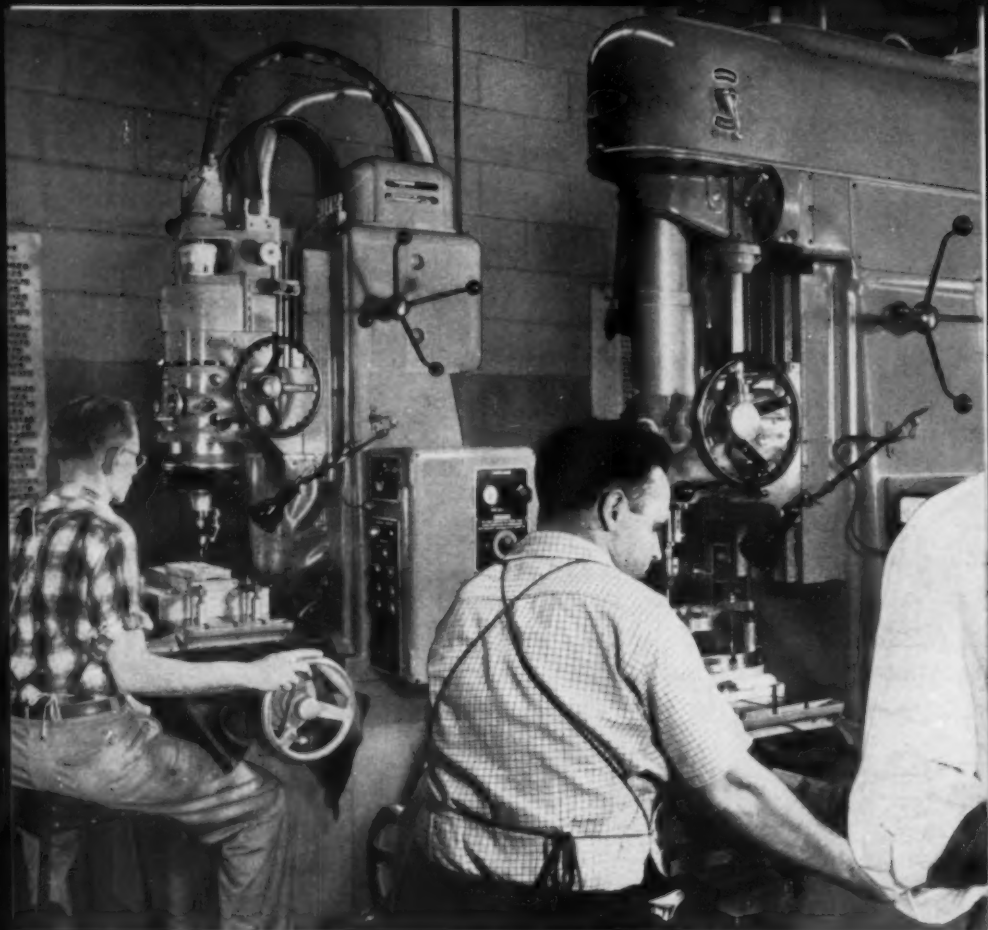
investigating and buying a Lodge & Shipley POWERTURN Lathe as a profitable replacement.

Production requirements change. The lathe purchased just a short time ago may not be adequate . . . judged by today's production, accuracy and economic standards. Details in Sweet's Machine Tool File; contact local representative through Yellow Pages or write direct for case histories and Bulletin No. L-103:

The Lodge & Shipley Co., 3074 Colerain Avenue, Cincinnati 25, Ohio.

\*Names and details on request.

# Lodge & Shipley



## "We're now splitting tenths, thanks to Moore's"

*say Karl Harig, chairman,  
and Herbert Harig, president  
of Harig Manufacturing Corporation, Chicago*

**"Our operators feel these are the best  
machines they have ever worked on..."**

**"Moore's No. 3 Jig Borer and No. 3  
Jig Grinder take care of the  
tenth-splitting tolerances required  
by industry today..."**

These are the words of two of America's acknowledged tooling leaders, active heads of one of the country's foremost independent producers of accurate dies—carbide, lamination, progressive, and other precision tooling.

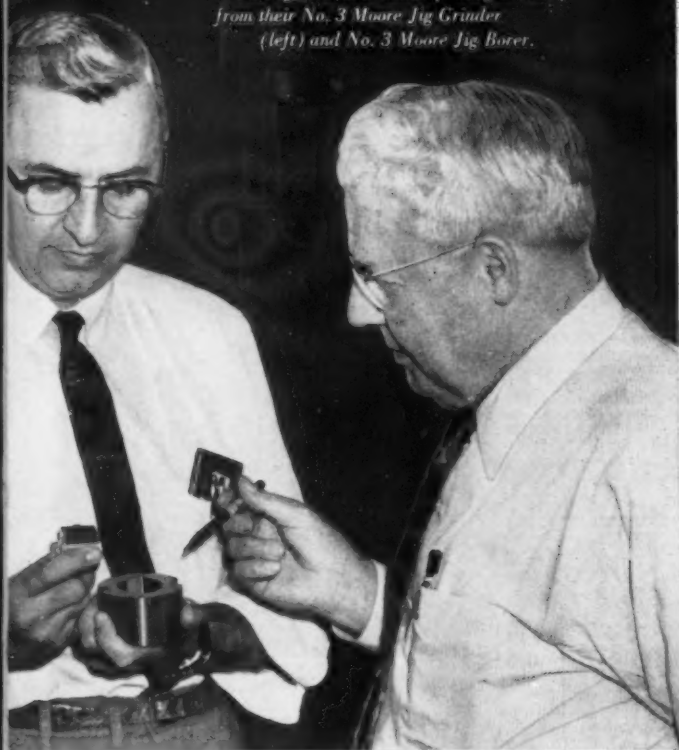
Says President Herb Harig, former president of National Tool & Die Manufacturers Association:

"Moore's line of Jig Borers and Jig Grinders has been an integral part of the development and success of our company from 15 employees in 1937 to 120 today. We have always been



**manufactured by**

*Herbert Harig, president, and Karl Harig, chairman, Harig Manufacturing Corporation, Chicago, examine tenth-splitting accuracy from their No. 3 Moore Jig Grinder (left) and No. 3 Moore Jig Borer.*



## new No. 3 Jig Borer and Jig Grinder"

Made and calibrated to the new international inch.

among the first to install each new model. That's why we are among the first with Moore's tenth-splitting No. 3 Jig Borer and No. 3 Jig Grinder.

"As evidence of how indispensable we consider this equipment, over the years we have enlarged our Moore Jig Boring and Jig Grinding Department to 15 machines!"

Sums up Chairman Karl Harig:

"When owner-management invests its money in machinery, it does so only after thorough analysis and careful selection. I don't know of any machine

tool manufacturer which meets both tests better than does Moore."

There's little more we can add, except to say that we stand ready to help you duplicate Harig's record of satisfaction. You can start by asking today for our detailed literature on the new No. 3 machines with their larger tables; hardened, ground and lapped ways; no gibs, no overhang.

Also, our dealer organizations will gladly share with you their extensive knowledge of holes, contours and surfaces (see column at right).

### Moore dealers know holes, contours & surfaces

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  - B-H-S Machinery Company  
217 Airport Boulevard  
South San Francisco, California
  - Brett Machinery Company  
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Oak Park, Illinois
  - The Cameron & Barkley Co.  
Machine Tool Division  
107 South Franklin Street  
Tampa, Florida
  - State Machinery Company, Inc.  
1800 North Meridian Street  
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221 Third Avenue, S.W.  
Cedar Rapids, Iowa
  - Ernst-Eichman Machinery Corp.  
323 West Murdock Street  
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  - Peninsular Machinery Company  
19178 James Couzens Highway  
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  - Ernst-Eichman Machinery Corp.  
1701 Locust  
Kansas City 8, Missouri
  - William Scheer Company  
6376 Clayton Road  
St. Louis 17, Missouri
  - Jeffreys Engineering & Equip. Co.  
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Greensboro, North Carolina
  - The C. H. Gosiger Machinery Co.  
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  - Parks Machinery Company  
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**MOORE SPECIAL TOOL COMPANY, INC.**

Bridgeport 7, Connecticut





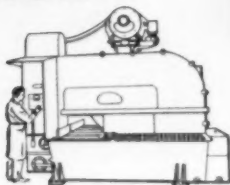
# NEW Friction Saw Cuts Structurals-Rails & Pipe..

## FAST!

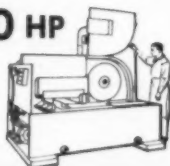
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AVAILABLE IN

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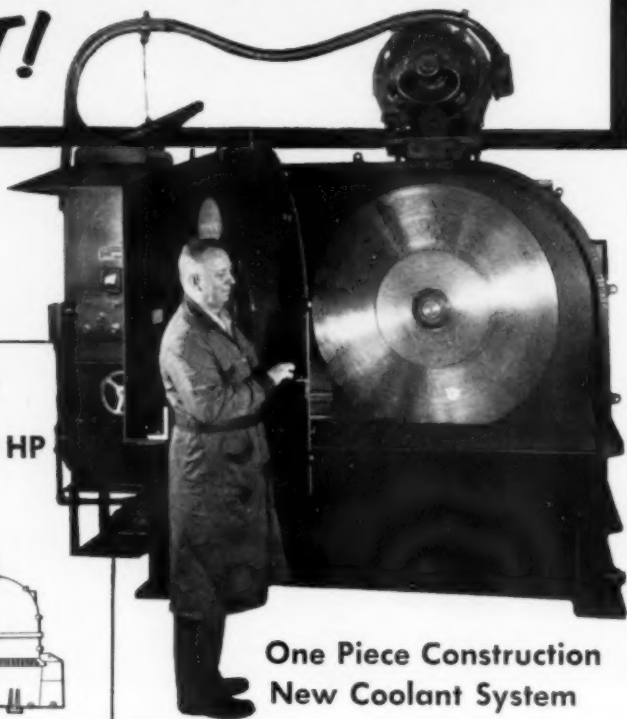
150 HP



40 HP



**Ty-Sa-Man**  
SINCE 1885



### One Piece Construction New Coolant System

These revolutionary new friction saws are one-piece construction . . . need no expensive pits . . . can be moved quickly and cheaply. New coolant system keeps cut hot, blade cool . . . electronic pressure feed eliminates complicated hydraulic system . . . varies pressure as blade moves through different thicknesses. Steel safety shroud reduces noise level . . . stops flying sparks.

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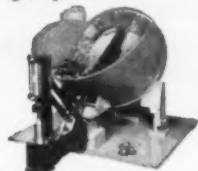
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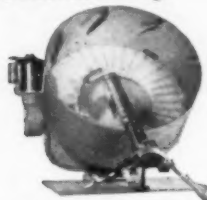




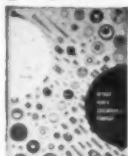
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**ROTARY FEEDER** for high production feeding.



**ROTARY HIGH SHELL FEEDER** for maximum holding capacity.



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# **DPS selective feeders**

It takes fast, automatic feeding to satisfy the appetites of today's automatic assembly machines. And nowhere can you duplicate the range of equipment, the specialized experience in selective feeders offered by Detroit Power Screwdriver Company.

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COMPANY**

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# "most used grinder" say customers

In checking with the tool, die, gage and general production shops that use SANFORD SURFACE GRINDERS, the most frequent comment was that Sanford Grinders were the "most used" of any grinders in the shop.

**WET  
or DRY Model MG**

## PARTIAL SPECIFICATIONS—

Capacity — 8" x 12" x 12".

Table travel — 13", traverse 8 3/4".

Vertical clearance 12" under 7" wheel.

Standard grinding wheel—7" x 1 1/2", 1 1/4" hole.

Spindle speed approx. 3000 RPM.

Motor, 1/2 HP, single or 3 ph., dynamically balanced.

Floor space—45" x 38" x 62" high.

Net wt. with stand approx. 630 lbs.

Others have tried to copy but there's a "feel" that comes from the precise individual quality and workmanship that goes into every SANFORD GRINDER. It's the factor that can't be found in any other grinder.

So widely used you can ask users in your own area how they like the low priced Sanford Surface Grinder.

Write for illustrated and fully descriptive literature, reconditioning facilities, optional equipment and prices.

*Representatives in major industrial areas*



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## CUTTING TOOLS

are

*"Engineered for You!"*

For almost half a century ECLIPSE has engineered and produced quality cutting tools. These years of leadership in the field guarantee the superiority and dependability of all ECLIPSE products. For longer tool life, finer finishes and better all-around performance, look to the symbol of perfection.



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- CORE DRILLS
- BACK SPOTFACERS
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### ECLIPSE COUNTERBORE COMPANY

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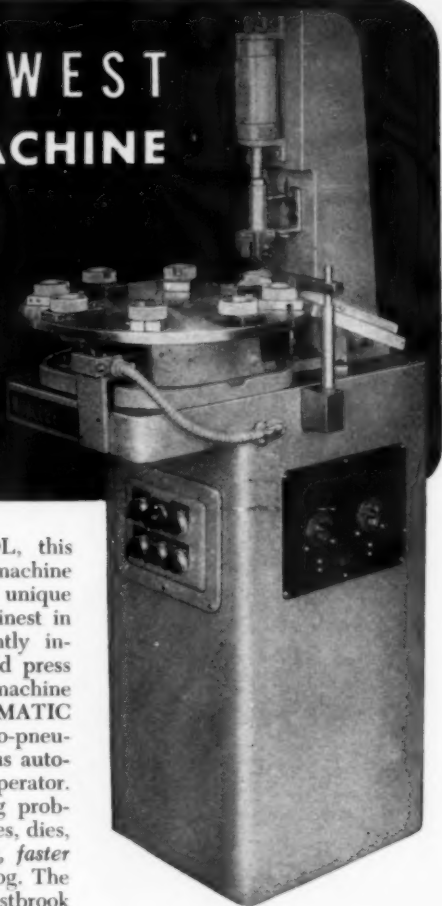
# new NOBLEWEST MARKING MACHINE

*air-marks*

**2500**

*pieces per hour*

**AUTOMATICALLY**



Featuring CYCLOMATIC CONTROL, this new model 400 dial feed marking machine is another example of NOBLEWEST'S unique ability to provide industry with the finest in high speed equipment for permanently indented marking. With an air operated press head and dial feed, this marking machine incorporates NOBLEWEST CYCLOMATIC CONTROL . . . an exclusive electro-pneumatic circuit which provides continuous automatic cycling at any speed to suit operator. Whatever your marking or numbering problem, NOBLEWEST makes the machines, dies, and fixtures for doing the job *better, faster* and at *lower cost*. Write for new catalog. The Noble & Westbrook Mfg. Co., 9 Westbrook St., East Hartford 8, Connecticut.

*A few desirable territories open to qualified representatives*

MARK IT BEST WITH



# ***NOBLEWEST***

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EMBOSSING  
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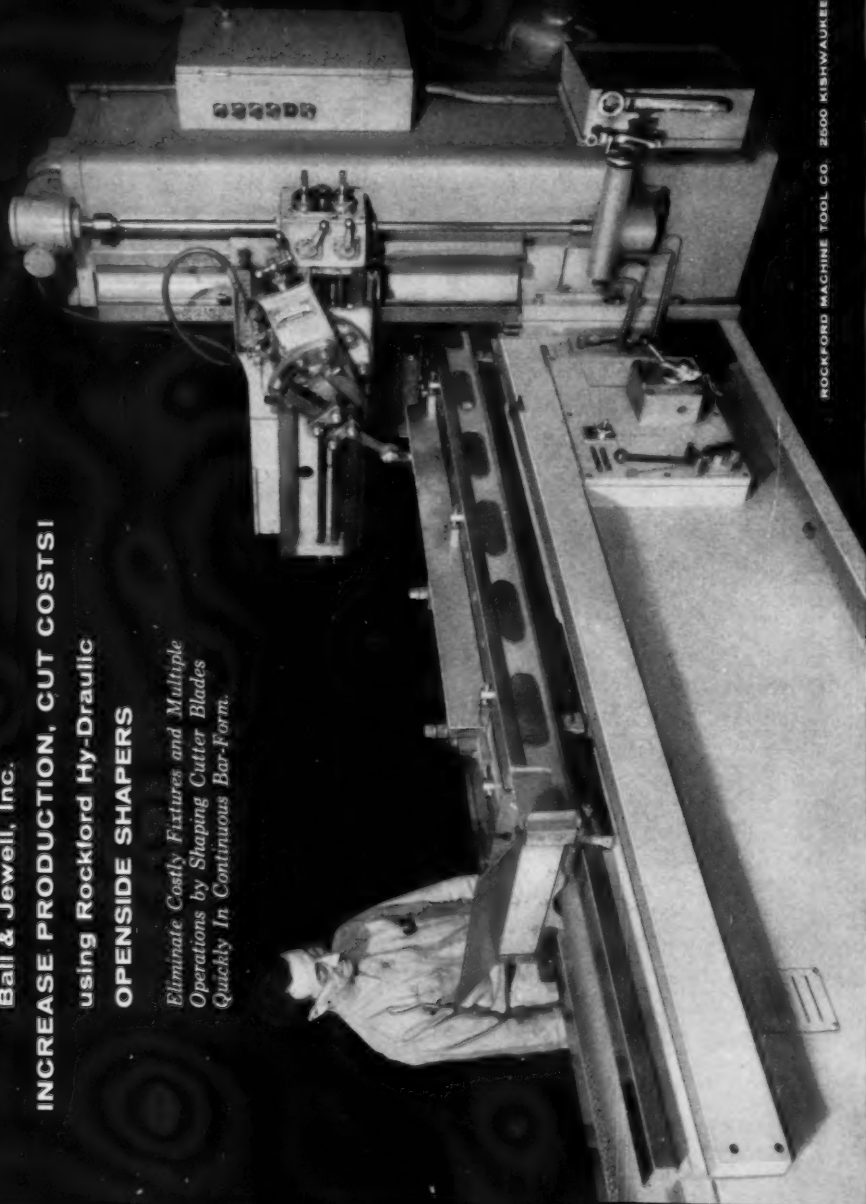
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## INCREASE PRODUCTION, CUT COSTS!

using Rockford Hy-Draulic  
OPENSIDE SHAPERS

*Eliminate Costly Fixtures and Multiple  
Operations by Shaping Cutter Blades  
Quickly In Continuous Bar-Form.*



ROCKFORD MACHINE TOOL CO. 2600 KISHWAUKEE STREET ROCKFORD, ILLINOIS

# HY-DRAULIC

*Serving the Industry Since 1852*



*Specify*

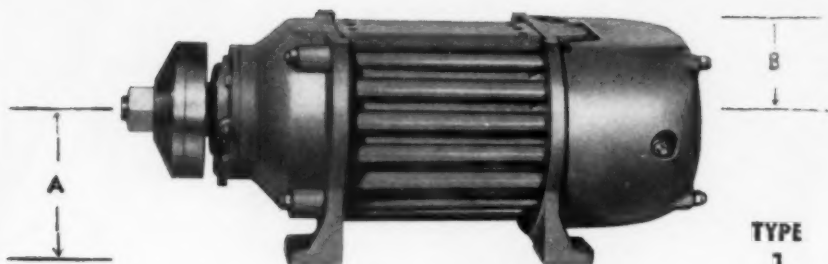
**WOODS MOTOR ARBORS**

®

*for*

**MORE POWER**

*in* **LESS SPACE**



"A"  
DIMENSION

4½"

5⅛"

6½"

8¾"

HP at  
3600 RPM

1 - 7½

1 - 20

5 - 30

20 - 60

FRAME  
SERIES

20

30

40

50

"B"  
DIMENSION

3¼"

4"

5⅛"

7-1/16"

*Send for descriptive material*

**MOTOR DIVISION**

**S. A. WOODS MACHINE CO.**  
27 DAMRELL STREET  
**BOSTON 27, MASS.**

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# Combination Center Drills

HI-SPIRALS  
CENTER DRILLS

OLD STANDARD  
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NEW STANDARD  
NUMBER DRILLS

## ALL THREE

in Regular, Arbor or Bell Type from smallest to 1" sizes

**CIRCLE R Heat treated**

**To Better Your Production**



**CIRCLE R** Center Drills include "all three" in the full size range up to 1" plus special lengths and diameters to meet your requirements. And after precision manufacture, we perfect them for your use with our exclusive heat treatment. Ask your Circle R Specialist.

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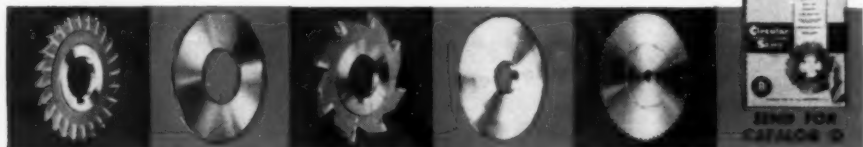
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KNIVES & ROTARY SHEAR BLADES • CIRCLE TOOL STEEL SAWS • SOLID & TIPPED TUNGSTEN CARBIDE SAWS • COMBINED DRILLS & COUNTERSINKS • CENTER REAMERS

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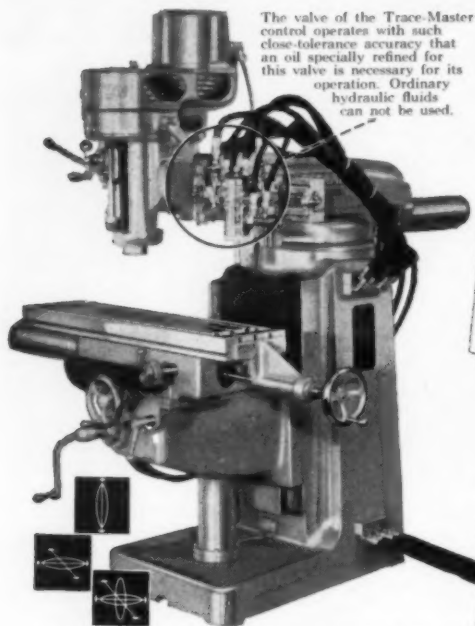


Designed for the "Missile Age"

**GORTON**

# "Trace-Master" Mastermil

with exclusive combination of sustained toolroom accuracy  
and precision-built Trace-Master Hydraulic tracer control



The valve of the Trace-Master control operates with such close-tolerance accuracy that an oil specially refined for this valve is necessary for its operation. Ordinary hydraulic fluids can not be used.

**Nowhere Else will you find this combination**

1. TWO H.P. spindle motor
2. Finest Milling Head in its class
3. 80 to 5,600 RPM spindle speeds
4. Rigidity... (2,800 lbs net weight)
5. Extra long saddle

**Nowhere Else will you find this versatility**

1. Production profiling
2. Scanning
3. Duplicating... die and mold work
4. Milling... conventional and climb
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**3 Models Available** (1) 180° Vertical Hydraulic Feed to Knee (2) 360° Cross Hydraulic Feed to Ram and Longitudinal Hydraulic Feed to Table (3) 3D Hydraulic feed to knee, ram and table for 3-dimensional work. Trace-Master controls can be furnished with the Model 1-22 Mastermil illustrated above or the Model 9-J Super-Speed Vertical Mill with single spindle, twin spindles and/or six inch higher column for additional vertical capacity.

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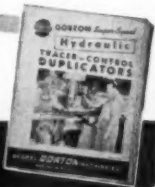
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1404 RACINE STREET

RACINE, WISCONSIN

SINCE 1893

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**DIE-PART  
PORTELVATOR®**

(OR AN ENGINEERED VARIANT)

will speed your work  
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*Top plate raises and lowers for fitting operations  
and rotates 360° to give easy access to die.*



Write for our  
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It gives full details.

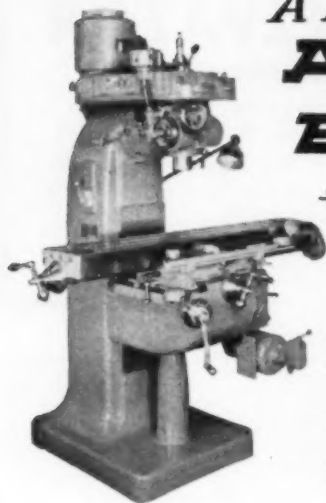


**THE HAMILTON TOOL COMPANY 825 SOUTH NINTH ST.  
HAMILTON • OHIO • U.S.A.**

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*A Lot More*  
**POWER**

*A Lot More*  
**ACCURACY**  
**ECONOMY too!**

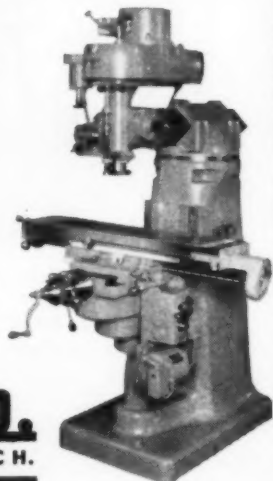


**INDEX "SUPER 55" VERTICAL MILL**

● 1 1/2 HP Head or optional 2 HP with continuous duty motor gives 50% or more capacity . . . More rigidity, more accuracy . . . Increased horse power and dynamically balanced Cast Iron Pulleys and Drive System afford improved production capacity . . . More weight in the column, heavier ribbed column, heavier knee, heavier saddle.

**INDEX "45" VERTICAL MILL**

● Unique square design of overarm affords more rigidity, greater accuracy . . . Provides extra range and capacity . . . More power at the cutter. No adjustment required on overarm and head after use . . . No need to re-indicate head after moving overarm . . . Speed range with nine changes makes possible the use of high speed or carbide tipped cutters to best advantage.



**INDEX MACHINE CO.**

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# HERE'S FLAT FINISHING AT ITS *Very Best*



## GRIND...POLISH...DEBURR in one operation with *Hammond* FLAT FINISHERS

For fast, uniform, economical finishing of flat work such as sheets, bars, strips, stampings and extrusions with one machine, one operator and one pass.

**AUTOMATIC AIR TENSIONING:** maintains correct tension on abrasive belts and conveyor belt • **VARIABLE SPEED CONVEYOR:** rate of feed is adjustable from 0 to 60 FPM • **WORK HOLDERS:** hold-down rolls, electro-magnetic platen and various types of conveyor belts • **AMMETER CONTROL:** an ammeter for each head allows operator to determine and maintain the polishing pressure necessary for a uniform finish and longer belt life • **V-BELT DRIVE:** allows abrasive belt speed to be changed to suit the work • **MICROMETER DIAL:** controls heads for required depth of cut.

Write for literature today.

**SEND SAMPLES**  
Send us one finished and several rough samples. You will receive a complete Engineering Report and Production Analysis without obligation.



**1 TO 6 HEADS  
6" to 12" WIDE**



Hammond Flat Finishers are available in 6", 8", 10" and 12" widths — handle work up to 6" high.

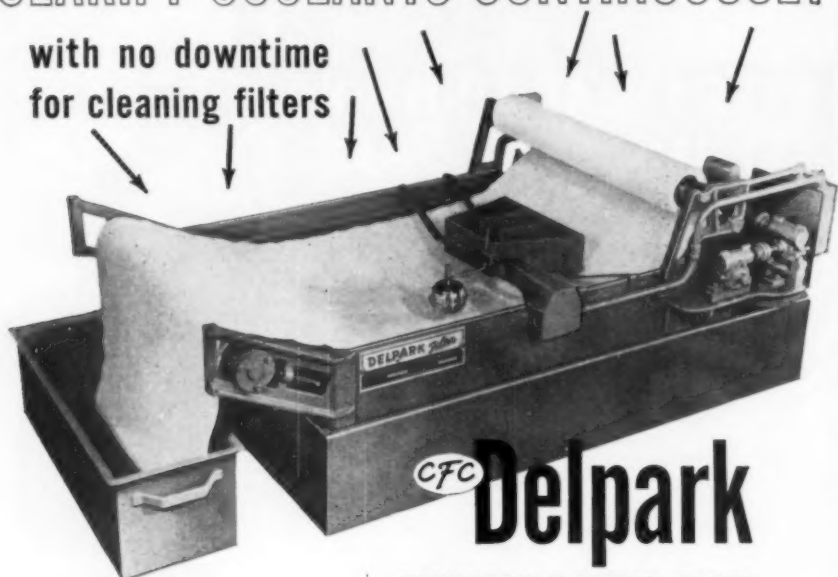
*Hammond Machinery Builders* INC.  
1614 DOUGLAS AVE. • KALAMAZOO, MICHIGAN

See Us At The Industrial Finishing Exposition — June 15-19 — Detroit — Booths 261-266.

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# CLARIFY COOLANTS CONTINUOUSLY

with no downtime  
for cleaning filters



## DISPOSABLE MEDIA FILTER

The CFC Delpark Disposable Media Filter is self-cleaning . . . automatically. Full flow filtration of coolants is uninterrupted during the cleaning cycle. There's no costly downtime for cleaning the filters or reservoirs.

By continuous removal of solid particles, clean coolant is returned continuously to the work area. You get greater machine efficiency, better finishes, increased output, less wheel dressing, longer wheel life, and extended coolant life. Valuable materials, such as diamond wheel particles, are easily recovered.

The filter material, fed from a roll, rests on a flat endless conveyor. Dirty coolant is fed on to

the filter material. Clean liquid passes through by gravity while solid contaminants remain on surface of filter material. When flow rate is reduced sufficiently, liquid level rises raising a float. This actuates a switch which causes conveyor to carry filter material and swarf forward, and bring a new clean filter surface under the incoming dirty coolant. Cycle is repeated automatically as necessary.

The CFC Delpark Disposable Media Filter is also designed for cutting oils, quenching oils and other liquids of light viscosity. Standard units have capacity of 2 to 700 gpm. Write for technical literature to Dep't MT

**COMMERCIAL FILTERS CORPORATION**

MELROSE 78, MASSACHUSETTS

PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

**MICRO-CLARITY AT MINIMUM COST**



with genuine *Hempstead Filter*  
Tubes for controlled micro-  
clarity of industrial fluids.



Selective filtration of oils • water-oil  
separators • magnetic separators •  
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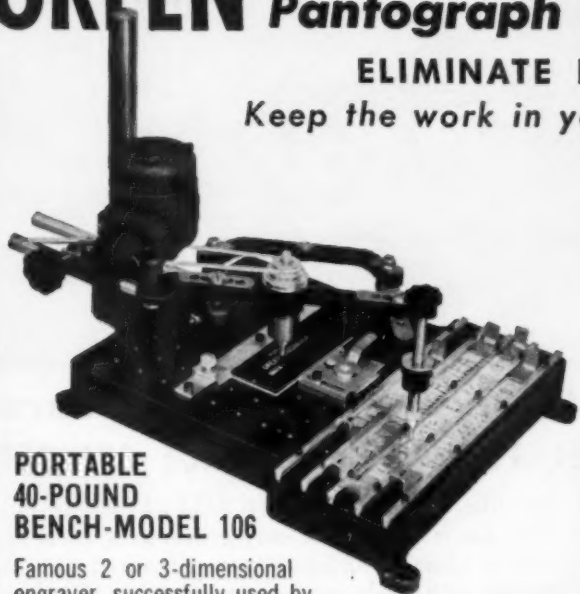
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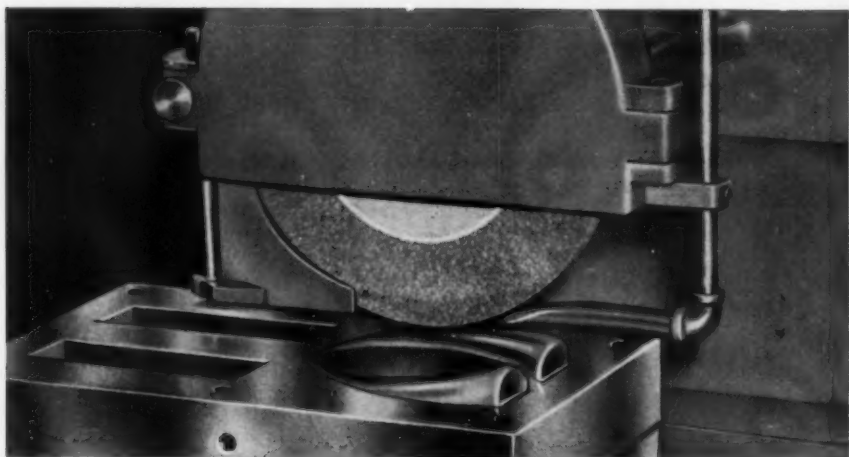
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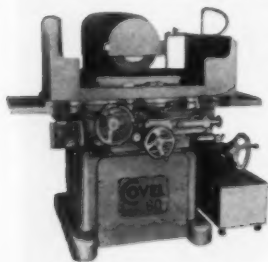
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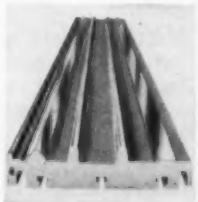
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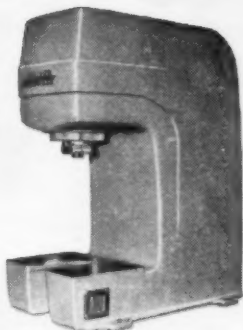
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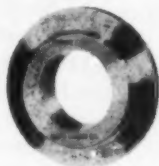
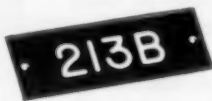
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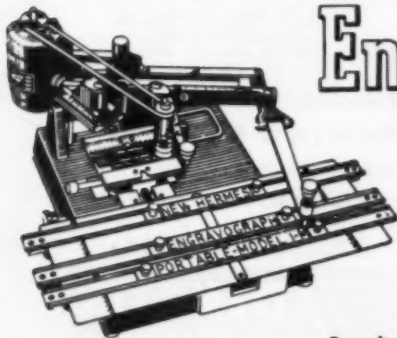
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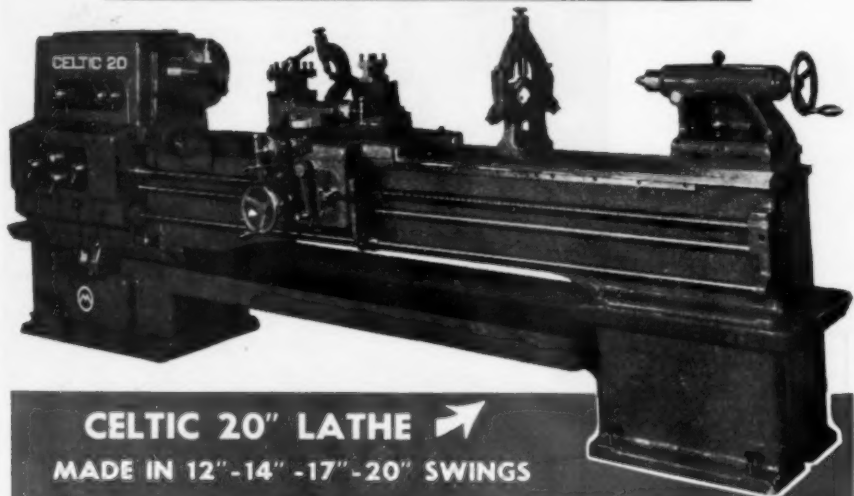
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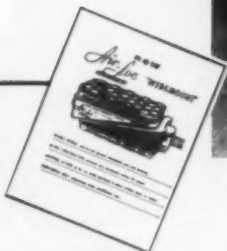
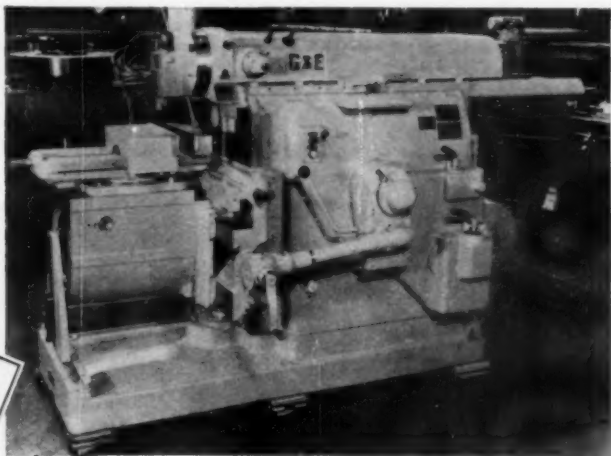
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▶ double-wedge construction which permits immediate precision leveling

▶ keyed construction which prevents movement within the mount

▶ sizes available thru distributors, and prices

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This Gould & Eberhardt 24" Industrial Universal Shaper, operating at 120 cuts per minute with a 4" stroke, is installed without bolts on a new type machinery mount called WEDGMOUNT. A dial indicator at the base of the shaper showed a total oscillation of only .022" during operation, and no "walking." The 7,800 lb. machine is installed on six WEDGMOUNTS, each type 3" x 6" S. Before operation, precision leveling is achieved by simple adjustment of a bolt within each mount. Top and bottom of each mount is surfaced with patented "Air-Loc" pads, which provide the high degree of friction required to hold the machine in place despite its strong lateral thrust.

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<b>Interview with Robert W. Galvin, president, Motorola, Inc.</b>	<b>95</b>
<b>Mist Cooling Up-to-Date</b>	<b>105</b>
<b>Arbitration of Work Standards—2 Cases</b>	<b>110</b>
<b>Outlook for Man-Made Diamonds</b>	<b>118</b>

**Washington News.** California is capturing the lion's share of the defense business; labor-management racketeering cases will be prosecuted; at least four Democratic senators await the sound of the bell in the presidential ring. See Roundup of Washington News. ....Page 89

**Interview with Robert W. Galvin.** Every year the consumer has a wider choice of goods and services from which to select. Some industries are feeling the pinch of consumer resistance, but Motorola, Inc., one of the leaders in the electronics products field is going great guns in the stereo high fidelity, car radio and portable radio branches of their business. Robert W. Galvin, president of Motorola, Inc. asserts that sound design and engineering will pay dividends in the coming months and years because the consumer is upgrading his tastes and, more than ever, quality-value will be the basis for his choice. Mr. Galvin foresees more ways that the electronics industry can join with the metal-working industry to produce more efficient machine tools. ....Page 95

**Mist Cooling.** Cooling with a mist in atomized form is changing the entire concept of cooling and lubricating all types of fabricating operations. Here is a general discussion on the principles of the process, and what users report about the advantages over conventional methods of flood cooling with respect to various types of applications. ....Page 105

**Arbitration of Work Standards.** Anyone


having had an experience with a work standards dispute going to arbitration should compare his methods of attack with Harold R. Nissley's account of his experience in arbitrating two cases: 1) When an increased work load is required of a day work operator; 2) A new inspection rate is challenged. Although these cases may differ from particular cases you have in mind, Mr. Nissley's methods of attack are worth studying. This is the fourth installment in the series on Practical Arbitration, Time Study and Work Simplification. ....Page 110

**How Good are Man-Made Diamonds?** Laboratory and field tests conducted under controlled conditions by Simonds Abrasive Co. confirm the superiority of man-made diamonds in resinoid, vitrified bonds for carbide grinding. Man-made diamonds in 75 concentration top the performance of 100 concentration natural diamonds in selected applications. This article by Chester A. Nisula, Product Manager of Simonds Abrasive Co. presents tangible evidence of the superiority of the man-made variety over natural diamonds. ....Page 118

**Modified Gear Shaper.** Attachments to a Lorenz gear shaper for chamfering and deburring transmission slide gears offer time saving features. The part handling to chamfer and deburr is eliminated; floor space of two additional machines is saved. This is a report from West Germany by J. Siegfried Spizig. ....Page 128



## Accurate, High-Speed **GEA**



58-tooth gear, 11 N.D.P.,  
17" 49' helix, 2" face  
width.  
Grinding allowance:  
0.014" over pins.  
Material: 4140 steel,  
245-285 Brinell hardness  
Grinding time: 15 minutes.

14-tooth pinion, 11 N.D.P.,  
17" 49' helix, 2 1/4" face  
width for full depth  
teeth.  
Grinding allowance:  
0.012" over pins.  
Material: 4140 steel,  
269-321 Brinell hardness  
Grinding time: 8 minutes.

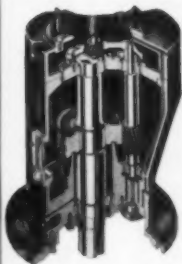
Tolerances:  
Lead—0.0001" per inch.  
P.D. runout—0.0005" T.I.R.  
Involute profile—  
plus 0.000, minus 0.0002".

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# GRINDING PHILADELPHIA GEAR



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Gear grinding by the Reishauer method is a generating process. The involute gear teeth are generated by a grinding wheel on which a helix has been developed. The tooth section of the wheel is usually that of the basic involute rack.

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ar Production Equipment

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We would like to receive twenty reprints of the article appearing in the January issue of your magazine on page 83, entitled "Practical Arbitration, Time Study and Work Simplification."

**F. T. Wilson**, Assistant Secretary  
The Thompson Grinder Company  
Springfield, Ohio

Tear sheets of this article are exhausted. However, the entire series will be reprinted after it runs its course. This will also include the 1954 articles by Mr. Nissley and make this a really worthwhile work on arbitration, time study and incentives.

### **Tape Control**

We are interested in obtaining any additional information on the Micro-Path Control System noted on pages 123 through 128 of the January 1959 issue. Since we are unable to locate an address for Micro-Path, Inc., it would be appreciated if you would forward our request to this company or inform us of the proper address.

We would also appreciate any literature or the name of the manufacturer of the Ringspann discs noted on page 116 of the same issue.

**R. J. CUTSHALL**  
SPEEDWAY FLAME PLATING  
LINDE COMPANY  
Indianapolis 24, Indiana

In the January 1959 issue of BLUE BOOK, page 123, describing a tape control milling process we would appreciate receiving more information on this or a reference as to where it could be obtained.

**H. H. WYDOM**  
BROCKTON TOOL CO.  
South Easton, Mass.

**Producer of the Micro-Path system**

is **Topp Industries**, 5221 W. 102nd St., Los Angeles 25, Calif.

### **Stub Drilling**

If you have any reprints of Harry Conn's article "The Potential Savings of Stub Drilling" they will be appreciated. As many as possible. These will be used for distribution among our Seminar members.

**HORACE FROMMELT**, DIRECTOR  
SPRING GARDEN INSTITUTE  
METAL REMOVAL CENTER  
Philadelphia 23, Pa.

### **Short Run Parts**

We would appreciate receiving at your convenience two (2) reprints entitled "Economical Production of Short Run Parts", appearing in your interesting monthly magazine MACHINE and TOOL BLUE BOOK; November, 1958 issue.

**R. BOUSQUET**  
INDUSTRIAL ENGINEER  
PRIMARY PARTS DIVISION  
CANADIAN MARCONI COMPANY  
Montreal 16, Quebec, Canada

### Work Holding Discs

The January issue of your magazine has an article by A. Maurer pertaining to work holding discs produced by Ringspann. We wish more information on who produces these discs and where they may be procured.

J. E. LASS

CHIEF TOOL DESIGNER

INTERNATIONAL HARVESTER CO.  
Melrose Park, Illinois

Distributor for the Ringspann disc is Neise Modern Tools, 404 Fourth Ave., New York 16, N.Y.

### Endless Belt Feeding

I am interested in the article in your December issue of MACHINE and TOOL BLUE BOOK entitled, "Endless Belt Feeding to a Progressive Die."

FRED J. HAUSER

WESTERN ELECTRIC CO.  
Chicago 23, Illinois



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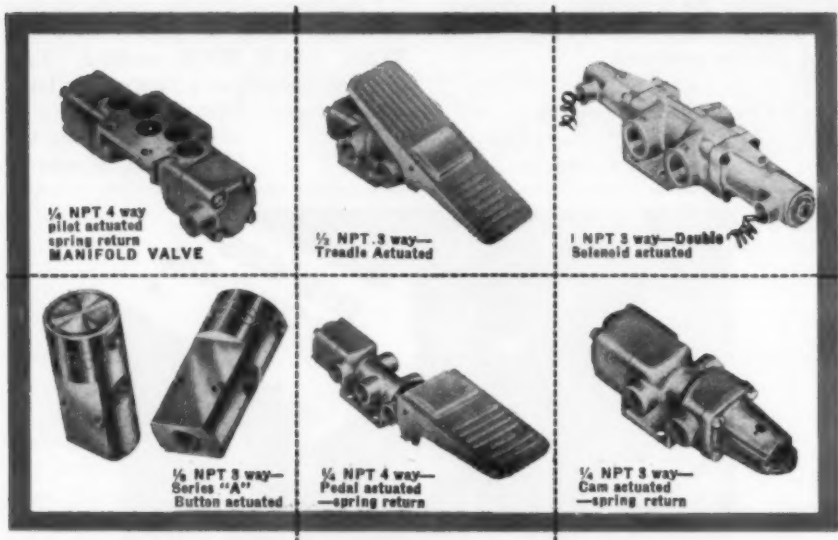
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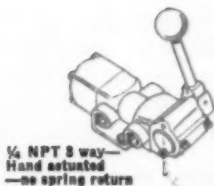
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## Meetings

- Apr. 3, 4—American Society for Quality Control, 7th Northwest Conference on Quality Control, Oregon Museum of Science and Industry, Portland, Oregon. Headquarters: P.O. Box 2001, Portland 14, Oregon.
- Apr. 6-10—American Welding Society, AIEE Electric Welding Conference, Hotel Sherman, Chicago, Illinois. Headquarters: 33 West 39th Street, New York 18, New York.
- Apr. 13-17—American Foundrymen's Society, Engineered Castings Show, Sherman and Morrison Hotels, Chicago, Illinois. Headquarters: Golf & Wolf Roads, Des Plaines, Illinois.
- Apr. 14, 15—Conference on Industrial Instrumentation and Control. Illinois Institute of Technology, 35 West 33rd Street, Chicago 16, Illinois.
- Apr. 18-22—American Society of Tool Engineers. Schroeder Hotel, Milwaukee, Wisconsin. Headquarters: 10700 Puritan Avenue, Detroit 38, Michigan.
- Apr. 20, 21—Seventeenth Annual SPI Canadian Section Conference, The Society of the Plastics Industry (Canada), Inc., Windsor Hotel, Montreal, Canada. Headquarters: 77 York Street, Toronto, Ontario, Canada.
- Apr. 21, 22, 23—American Society of Lubrication Engineers, 14th Annual Meeting, Hotel Statler, Buffalo, New York. Headquarters: 84 East Randolph Street, Chicago 1, Illinois.
- Apr. 26-30—National Screw Machine Products Association, Hotel Roosevelt, New York. Headquarters: 2860 East 130th Street, Cleveland 20, Ohio.
- May 25-28—American Society of Mechanical Engineers, Design Engineering Conference, Convention Hall, Philadelphia, Pa.
- June 14-19—Society of Automotive Engineers, Summer Meeting, Chalfonte-Haddon Hall, Atlantic City, New Jersey. Headquarters: 458 Lexington Avenue, New York 17, New York.

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pulley.

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functionally.

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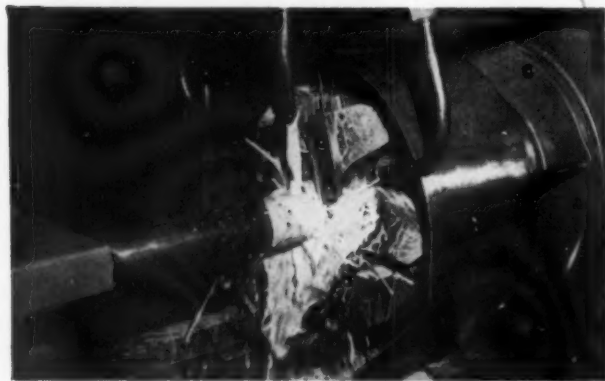
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# **WHY** *is chaser hardening important to your threads?*

When cutting threads—long tool life, maximum accuracy, and trouble-free operation can only be assured by proper chaser hardening. For example, LANDIS Tangential Chasers are often given special hardening treatment when work-piece design or material specifications so indicate. Just as with the blacksmith of years gone by, so chaser hardening today is an art. The ability to determine and apply the proper chaser-hardening technique is the result of our more than 50 years experience in a single field—THREADING. This is but one of the many ways in which LANDIS Threading Specialists may be of help. Whatever your need for generating threads—Cutting, Rolling, Grinding, or Tapping—LANDIS Threading Equipment will accomplish it most efficiently and economically.



**LANDIS Machine COMPANY**  
WAYNESBORO • PENNSYLVANIA • U. S. A.

**We have the power to destroy Russia** utterly, and she has the power to destroy us. There is no way in the future for either of us to win a war.

**Adm. Arleigh Burke**  
Chief of Naval Operations

### **Democratic Senators Aspire to Presidency**

At least four Democratic senators await the sound of the bell in the Presidential ring, and it appears that Majority Leader Johnson (Tex.) is the ringside favorite. His broad legislative program is skillfully designed to appeal to most Americans. He has also proved himself capable of dealing successfully with liberal and conservative factions of his party. Mr. Johnson's southern affiliation is perhaps the most formidable deterrent to his nomination.

Senator Kennedy (Mass.), high on the list of contenders, is a staunch believer in legislation designed to promote labor reforms, but he realizes that his platform must be tempered to appeal to those who hold moderate views. Senator Symington (Mo.) will base his campaign on defense legislation.

Liberals are supporting Senator Humphrey (Minn.), an advocate of major social and civil rights reforms. Mr. Humphrey, recently

returned from Russia, stresses the need for a thorough analysis of foreign affairs.

### **Labor-Mgmt. Racketeering Cases to be Prosecuted**

Twenty-eight lawyers of the Justice Department's Antitrust Division have been assigned to prosecute labor-management racketeering cases under the Sherman Act. Although officials avow they will not use the Act as a club to attack unions, labor-management "pay-offs" will be considered violations of the antitrust laws. Monopolistic practices of unions engaged in commercial ventures also shall be investigated.

The Senate Rackets Committee has criticized the Department of Justice for not taking action on some of the Committee's disclosures. If weaknesses in the antitrust statutes become apparent through the prosecution of these cases, the McClellan group will ask Congress to strengthen the laws.

### **California Captures Lion's Share of Defense Business**

While eastern manufacturers of missiles and aircraft are operating below capacity, e.g., Martin (Baltimore), Republic (New York), and Fairchild (New York and Hagerstown, Md.), approximately 21.4% of Government prime missile contracts, amounting in the aggregate to \$8 billion, are held by California contractors. In addition, California's subcontracts total about \$1.3 billion.

This disproportionate allotment has caused many eastern and even some western members of Congress to rise up in arms, and they are taking steps to prevent further awarding of missile contracts to the Pacific Coast. If necessary, they will take their grievance all the way to the White House.

Senator Butler (Rep., Md.), is one who vehemently protests the situation. Says Mr. Butler: "It is most important to maintain in an excellent state of health vital facilities for missile and aircraft manufacture in the East. It is against the Nation's best defense interests to

concentrate such manufacture in only one State in the Union. The Golden State is facing a battle on this issue because it doesn't seem content with the hog's share. So, if it wants a fight—California, here we come."

### **National Chamber Seeks to Reconstruct Tax System**

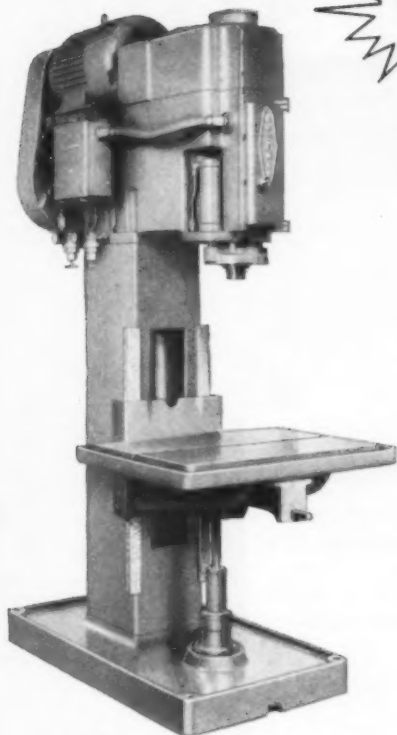
The Department of Taxation and Finance of the U.S. Chamber of Commerce has announced that it is urging Congress to reconstruct and simplify our national tax system. It is promoting the establishment of an impartial study group which would take a keen look at the strengths and weaknesses of our present tax system, investigate the tax systems of other nations, consider the writings and proposals of learned men in the field of tax philosophy and tax practice, and devise a tax structure which will stimulate rather than retard our national economic growth. Constant tinkering with our tax laws, they believe, will do little more than "add a further layer of patchwork to the existing crazy-quilt pattern."

**"Controlling Inspection Costs in Small Plants"** is Bulletin No. 96 of the series, "Management Aids for Small Manufacturers," published by the Small Business Administration, Washington 25, D.C. It admonishes the reader to make sure that inspection procedures are set up and run efficiently; that inspectors are properly chosen and trained; that gages and equipment are maintained; that inspecting is done accurately.

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## MODEL 10E-20



Six features of this new, precision-built Kaufman Tapping Machine are:

1. Lead screw control for accurate threads and maximum tool life. Maximum  $4\frac{1}{2}$ " lead screw travel.
2. Rapid approach of spindles to work.
3. Clutch operated for faster operation — Reversing spindles at twice forward speed.
4. Six speed transmission providing spindle speeds of 80-350 RPM with 3-1 ratio or 160-700 with  $1\frac{1}{2}$ -1 ratio clutch.
5. Units provided with 5-7 $\frac{1}{2}$ -10 H.P. Motors.
6. Speeds and H.P. available for highly efficient tapping from  $\frac{1}{16}$ " through 2" NC taps or smaller taps with use of multiple head.

KAUFMAN

For additional information about the new Model 10E-20 or other Kaufman machines for single or multiple operation, write or telephone:

**KAUFMAN MFG. CO.**

539 S. 29th Street

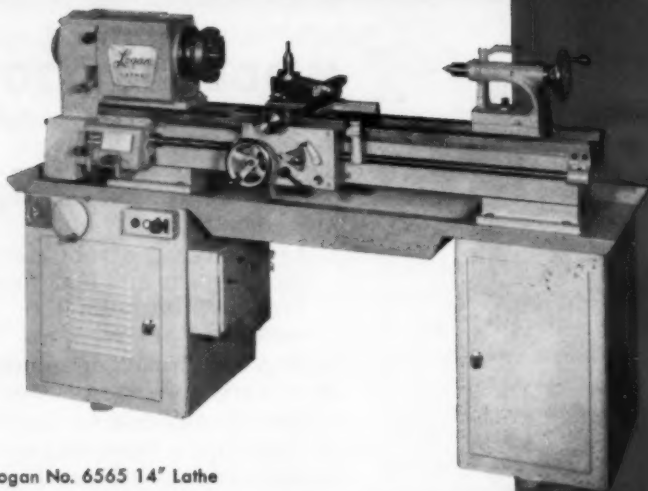
Manitowoc, Wisconsin

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its specifications add up  
to high production capacity

# Logan

## 14" Lathe



Logan No. 6565 14" Lathe

Logan designs greater reliability and accuracy, and longer life into its lathes by a generous combination of high-capacity features. For instance —

- An oversize spindle with 1½" bore turns on four super-precision ball bearings with built-in preload
- A variable-speed drive lets you change speed while work is turning—without shifting belts
- A warp-free lathe bed with high, strong walls braced by oversize ribs to withstand heaviest stresses; two V-ways and two flat ways are flame-hardened and precision-ground.

There are many more reasons why this and other Logan Lathes have a greater capacity. The complete specifications tell the story. Write for them.

- Spindle speeds to 2000 rpm
- 1½" Levermatic collet chuck capacity
- 14½" swing over bed
- 9" swing over saddle cross slide
- 40" between centers

**LOGAN ENGINEERING CO.** Dept. J-459 4901 Lawrence Avenue, Chicago 30, Illinois

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## Measure Everything in Terms of Cost?

Has top management been over-conditioned to base their decisions in terms of costs? Just how far can we go with cost consciousness?

Let's take the appraisal of supervisory effectiveness as a case in point. It is very important that top management be aware of the attitudes of the department heads. High morale is the sum of a person's confidence in the organization, his on-the-job associates and himself. Sometimes we forget that high morale and good performance go hand in hand.

One sure way to impair the morale of a department head is to judge his performance on the basis of "production costs" alone. There are several reasons why low production costs are not the only criterion.

When a department manager is led to believe that his chances for advancement—or even holding on to his job—rely primarily on his success in keeping costs down his efficiency becomes impaired. For one thing, errors in judgment are inevitable. If, in one department, the quality control is allowed to become lax to rush the work along to another department, the latter may make a comparatively poor showing because of the lower production standards.

It is safe to assert that costs do reflect managerial skill *if* the factors to be

evaluated can be equalized. Some factors that do have some bearing on the size of production costs are the nature of production, degree of mechanization involved, stipulations of the labor contract, economic conditions, etc.

It is one thing to expect a department head to utilize effectively the productive capacity of the men and machines under him, keeping scrap production or rework at a minimum. If the necessity to keep the production lines going has resulted in unrealistic bidding or other practices by top management, the department head can't be expected to recover the losses that are inevitable. This would take a miracle.

The ideal situation at the department manager level is to provide them with the proper number of subordinates to allow them more time for instruction, control of individual performances and cost control. Managerial work is divisible, but if a department head must assume all the duties of planning, organizing, directing, controlling and coordinating then the least top management can do is to refrain from putting road blocks in his way.

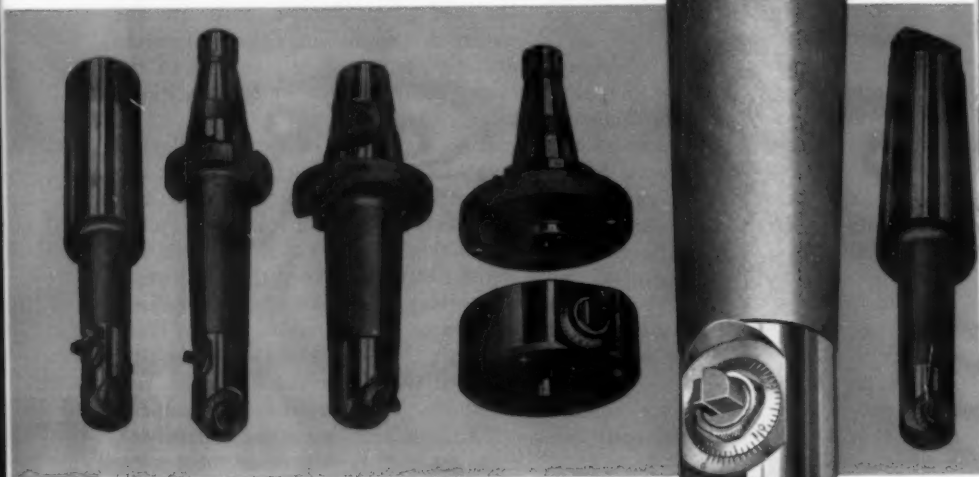
PAUL A. MELINE  
*Managing Editor*



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Your choice of over 330 Microbore standard single-tool or two-tool precision boring bars. A complete range of sizes and types available for boring and facing operations on any make of boring machine, milling machine or turret lathe. *Microbore micrometer vernier adjustment of each tool point* makes it possible to quickly set tools to precise dimensions. Boring range from  $1/2"$  to  $7 1/4"$  dia. Standard Boring Rings and Adapters extend range to  $13 3/4"$ . Available with Straight Shank, NMTB Taper, Morse Taper or Flash-Change. Carbide, ceramic, or high speed steel cartridges. Ordering is Simple! Fast! Direct! Standardize on Microbore—the complete tooling system.

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**An Interview with**  
**Robert W. Galvin**

**President, Motorola, Inc.**

*Is the consumer a wiser buyer today? Dynamic, young Bob Galvin thinks he is and relates what's ahead in the electronics field for the general public and industry*

By **Paul A. Meline**  
Managing Editor

**Q.** The financial pages report that consumer electronics products have made a strong comeback saleswise in the latter quarter of 1958. It appears that your company and your industry are giving the public more of what it wants. What have you to say about the trend of consumer wants that is taking place?

**A.** Probably the most significant



*Significant today in the marketing world: the consumer ha*

thing that has happened in our business in the last couple of years is that the consumer is a better informed buyer. The buyer has reached a new level of tastes.

In our case, we were able to add more value to our products in an area where people have become educated to want certain

features. In the case of high fidelity, for example, many people discovered that there was a value or an enjoyment factor in really good music reproduction and that it could be acquired at a reasonable price. The situation that existed eight or ten years ago, was that there were phonographs on the

**About Robert W. Galvin**

Born in Marshfield, Wis. on Oct. 9, 1922, Bob Galvin was raised in the Chicagoland area and attended the University of Notre Dame and the University of Chicago.

Bob has worked with Motorola Inc. since 1940. In 1949 he was elected executive vice president, and on Nov. 15, 1956 became president. He is a member of the board of directors.

One of his principal civic activi-

ties is the Junior Achievement of Chicago, a program that is national in scope, the purpose of which is to bring high school youngsters in direct contact with and actively operate small but real businesses. Bob Galvin is a trustee of the Illinois Institute of Technology and a member of the executive committee of Armour Research Foundation. He was chairman of the Republican Dinner in Chicago, held Jan. 20, 1958, an affair attended by President Eisenhower and 5,000 people.



**Photographed at head table with President Eisenhower** at the 1956 Republican Dinner in Chicago, Chairman Bob Galvin is busy directing activities.

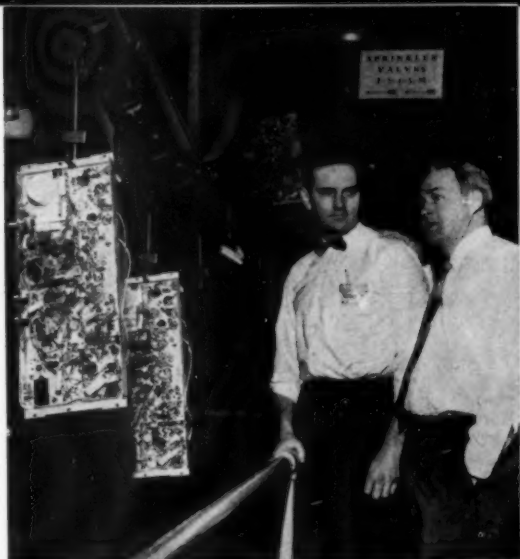
## *higher level of tastes*

market, but people didn't realize that there could be available good quality music reproduction for a fractionally higher price. The industry didn't realize that the customer was sufficiently educated to want anything better. We then all felt that the customer was only interested in certain average qualities.

We have since learned that the customer is more educated in the culture realm. A growing proportion of the buying public has learned also that, from a practical commercial standpoint, they can achieve culture at a reasonable price. This has added up to a value concept: the customer can get better music or in the case of television, better viewing pleasure. He can get a more reliable product for a marginal increase in price, which, because he is now better informed, he realizes is a better buy for him.

**Q.** *Has this phenomena come about because of more informative advertising and sales promotion?*

**A.** I think it is a broad gage phenomenon for which a lot of people deserve credit. I think that generally we have a more educated consumer today than we've ever had before. For one thing, more people are going further in school.



**Bob Galvin and foreman** observe television chassis on overhead conveyor prior to transfer to Franklin Park, Ill. branch for completion and assembly.

Advertising has played a significant role in upgrading the educational level and tastes of the American consumer, but I think it is as much a cultural revolution as it is anything else. I have often pointed to this little symbol: When has there been such an acceptance of the fact that the President of the United States paints in oils? People have just come to accept this as a good standard. I think that this acceptance, this willingness to go along, instead of playing down the culture aspect, relates to people who want better music in their homes.

**Q.** *Would you say then that products with important fundamental improvements are the most effective means to create obsolescence?*

**A.** The popularity of high fi-

*Motorola is aware of the wisdom and potential in*



**"We are developing new techniques . . ."**



**". . . which we think may revolutionize the science of electronics."**

delity reproduction demonstrated the public's interest in really good sounding music. The reason why stereo has increased interest in hi-fi, and the reason why stereo has been such a phenomenal success is that it provides a demonstrable, audible feature that the customer can understand and appreciate from the very first demonstration. It probably is one of the most demonstrable products our industry has had since television came along. Any person with two ears can hear a difference.

There are actually two answers to your questions about creating obsolescence. One, people who have good high fidelity equipment are getting an excellent value from

it, and will continue to receive value for years to come.

Two, many people with good hi-fi equipment are impressed with the greater value of stereo to the point that they are willing to convert it, trade it, or supplement it with stereo equipment.

**Q.** *I'd like to get your thinking on the place of the design and production engineer in industry. Would you say that their importance is increasing? I ask this because it seems that in the past emphasis has been on sales promotion by way of frills and low price appeals.*

**A.** All functional departments in our business or industry have always been important. However, the design and production engi-

concentrating more on basic research



**"With the fantastic achievements of miniaturization . . ."**



**"... industry will be able to do more kinds of jobs electronically."**

neer are playing a more prominent decision-making role in our product decisions than they have at any time in our history. They are very persuasive to the marketing department personnel. If they say a given product can be manufactured to a certain high standard only if we can put so much cost into it, the marketing department will be more persuaded to go in this recommended direction than if the engineers conversely say, "you can make a dollar out of your product and we will go the other way, but we don't recommend it." Therefore I would say that their status is higher.

**Q. Regarding your research program at Motorola, has there been**

*any trend toward emphasizing one area over another? I'm referring to such areas as development of new products, product improvement, fundamental research applicable to your industry and consumer attitudes.*

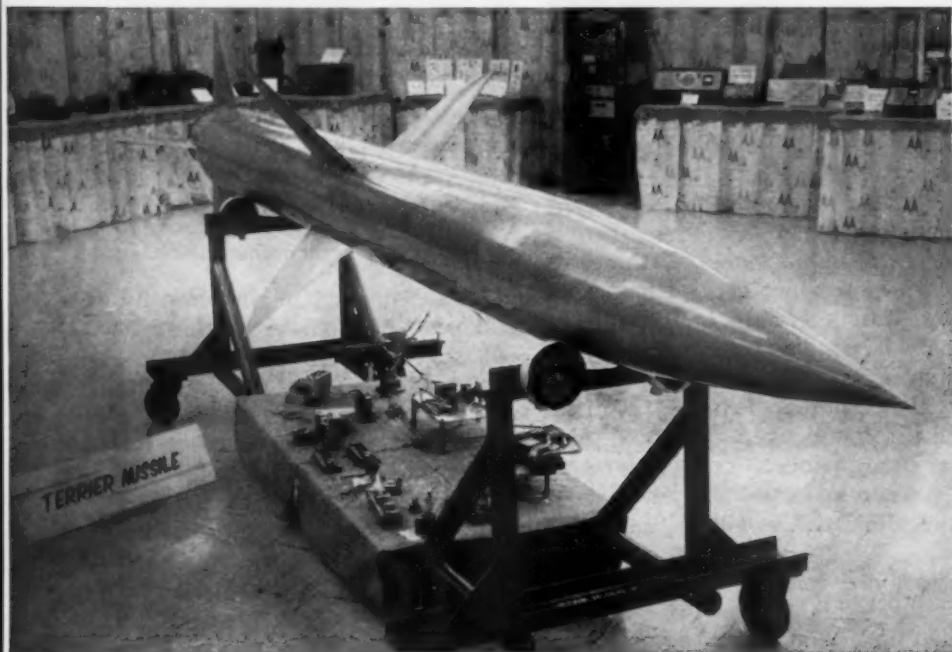
**A.** The practice in our company, and probably in general throughout our industry up to a couple of years ago, was to concentrate research efforts in the direction of product development and improvement. However, in the last few years we have seen the wisdom and the potential in concentrating more on basic research. By this I don't mean just the exploring of any new field of science that comes to mind. We always have a definite target.

*Price cutting? The consumer has demonstrated he will*

**Q.** What are some examples of your research efforts, significant to the metalworking industry?

**A.** The whole semi-conductor field, particularly transistors, is one of our important projects. We are working in this area with semi-conductor materials, and, of course, we have to develop all new techniques of assembly which require all new forms of machinery.

Another example is the development of new techniques which we think are going to revolutionize the science of electronics. The solid states electronics art is sort of an expansion or an extension of the semi-conductor art wherein we can make use of wholly new metal-like substances to achieve the same functions that were achieved by old-fashioned components a few years back.



Guidance system for the Terrier missile was developed and produced by Motorola, Inc.



## pay more for quality

Now, this should be important someday to the whole metal working trades, in addition to the economy as a whole, because we can probably achieve superior components, possibly some day at lower prices with a great deal more reliability. With the fantastic achievements of miniaturization, industry will also be able to do more kinds of jobs electronically than have been done before by pneumatic or mechanical means. I'm not referring solely to programming devices. The whole solid states electronics art is so new you are going to find many new applications of it. Undoubtedly we'll find ways of offering electronics service to the metalworking industry which today neither mechanical or electronics engineers are yet aware.

**Q. From the general public angle, what are some of the developments in electronics that you anticipate will materialize in the next couple years?**

A. The public as a customer is going to be the beneficiary of a number of new developments in electronics in the next couple of years. Many of these are built around the stereophonic phenomena. Already we have the stereophonic phonograph and records. Soon there will be magazine-



**Industry's first** practical, portable transistorized television set is exhibited by the president of the company that produced it.

load, cartridge-filled binaural tape players.

There are a number of laboratory efforts being made in the area of stereophonic radio broadcasting. This divides into two parts: the stereophonic broadcast over FM stations and the stereophonic broadcast over AM stations. We look forward to the time within the next couple of years when we will be manufacturing higher quality radios, somewhat more like the old console radios of some years ago, with excellent amplifiers and very high quality speaker systems; we will be picking up a single signal of one radio station

but dividing it into two channels for a stereophonic effect.

Another stereophonic phenomenon that probably will be a practical and very desirable product will be stereophonic audio on TV. This we will achieve by the same techniques as stereophonic radio, but we will have two speakers. With a speaker on each side of the picture and different sounds coming out of each side, a three-dimensional effect is the result.

Then, of course, there is the potential which has been discussed for some years, yet looks like it's still many years off: picture on the wall television. It appears to have promise, but before that comes we will probably have transistorized television products, which will give us the characteristic of more portability.

*Q. Every year the consumer has a wider choice of goods and services from which to select. Some manufacturers think this is a time for price cutting. What is your philosophy on this?*

*A.* Our conclusion is that this is not a time for price cutting. We think the American consumer wants the very best product he can possibly get at a very high level or standard; they will pay for such a product if it's reasonably priced. The reason we have turned away from the philosophy of delivering the lowest priced

product is because the customer has demonstrated he is willing to pay an extra margin of ten or twenty dollars, or whatever it may be, in order to get a product that



Several months during the year Bob Galvin commutes 100 miles daily by helicopter from his Wisconsin residence to his office. Here he is taking off from the roof of the main office building with Billy Talbert, captain Davis Cup team

is more reliable, save him service costs and also gives him greater pleasure. The bulk of our public is not shopping as they were a few years ago for just the lowest price for any given standard of product. They are obviously shopping for the best competitive price, but not necessarily for the lowest price.

• • •

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# **MISTIC MIST GENERATORS**



1ST-1 LC



2RH

## **Used for —**

- **DRILLING**
- **MILLING**
- **BORING**
- **TAPPING**
- **GRINDING**
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- **And all other types of machining**

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your cooling needs*



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MISTIC MIST GENERATORS—the most modern cooling method—saves time, labor and tool costs. It assures greater tool life, closer tolerances, better finishes and increased production. It's clean, simple to use and provides cooling for even the most difficult machining operations.

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Ask your Ryerson representative for complete details on Ledloy 170 tubing—and new Ledloy 375, world's fastest machining bar stock. These two newest additions to Ryerson stocks supplement the already large supply of screw steels and leaded alloys for all applications.



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**Ledloy® steels and screw stock**—Ledloy 300 rounds to 4", squares to 1½" and hexes to 3". Ledloy 375 rounds to 1" and hexes to ¾". Also on hand—all your requirements for C1213, MX1213, and leaded and non-leaded C1117 and C1141.

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**Alloy bars**—Complete selection of leaded alloys, including Ryerson Rycut® steels—fastest machining in their carbon ranges.

**Stainless bars and tubing**—Here, too, our stocks are the nation's largest, including easy-machining Types 303 and 416 in rounds, hexagons and squares.

**Carbon steel plates**—New EZ-Cut®-lead-bearing plates (hot rolled, low carbon manganese).

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MACHINE and TOOL BLUE BOOK

## MIST COOLING Up - To - Date

By Paul A. Maffei, Managing Editor

● Cooling with a mist in atomized form, discovered some years ago, is making gradual progress in metalworking operations. It is changing the entire concept of cooling and lubricating all types of fabricating operations. In fact, it is making many operations practical that were formerly considered impossible.

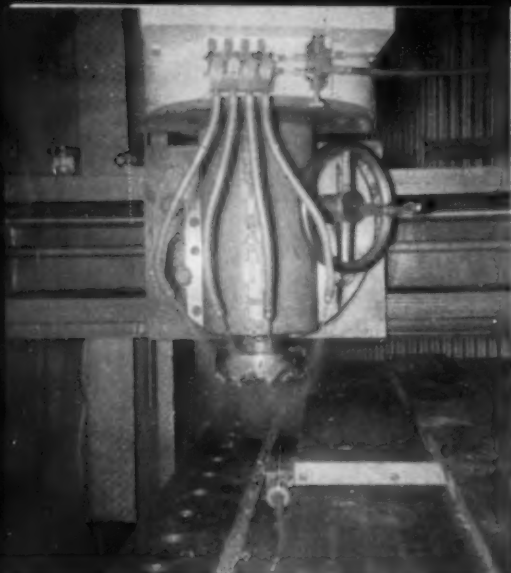
The term "mist cooling" is now used to define the use of coolants in mist or atomized form. It is a method of supplying coolant to metal cutting and grinding operations in which atomized fluid is directed from a nozzle, with air velocity, to the cutting operation. Cooling of high speed dies, never before possible, is now practical with mist cooling, and has resulted in as much as 500 percent increase in die life.

### How It Works

The basic parts of a mist spray system include a liquid reservoir and air and liquid control valves with spray nozzles.

Mist is generated by a specially designed nozzle, using compressed air from the shop air line. The air, passing through the nozzle, creates a vacuum in the liquid line which siphons the coolant from the tank. There is no pressure in the tank. The coolant is instantly vaporized and forms a conical mist pattern.

The principle utilized in a home refrigerator is that gases expand within a coil to absorb heat inside the box.



**Longer life** for carbide tipped milling cutters has been reported by users of this Aetna Mistic Mist installation.

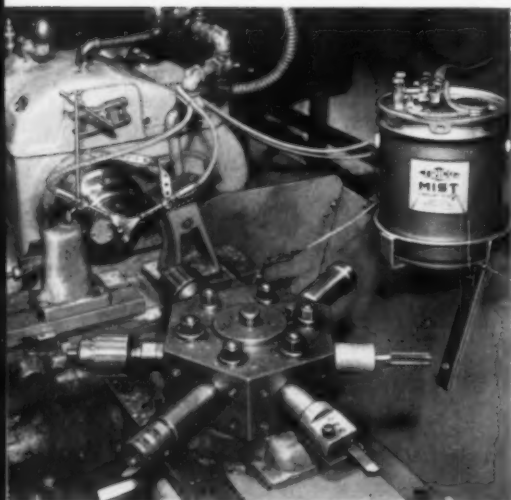
## MIST COOLING, continued

### *When a mist is employed*

Five cooling factors are present when water-coolant is entrained in an air stream and fed to a machining operation as a mist:

(1) Pressurized air, released thru a suitable orifice displays an elementary refrigeration principle; i.e., the temperature of compressed gas or air lowers as it is allowed to expand. Entrained liquid (a saturation of water-based coolant) supplements and increases the heat transferring ability of the cooling, expanding gas.

(2) The mist of the water base is the heat transfer medium.



**The points** of Trico mist generating nozzles are directed to the work by use of a magnetic base and adjustable arm.



**Milling of non-ferrous material** with a Precise Vapor Lub unit set-up.



*cooling is on the tool and workpiece only, not the chips*

(3) As the water content of the coolant is evaporated, the lubricating elements remain within the work zone in concentrated form. If fed correctly, these elements penetrate to the interface of the chip and tool where they function in reducing friction, and thus, heat.

(4) Convictional cooling takes place as the water vapor is rapidly moved out of the work area by the air stream.

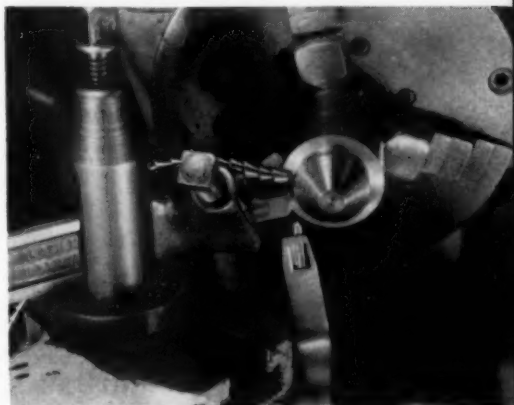
(5) The water content of misted coolant is instantly evaporated by the heat of the machine operation.

With the mist spray directed at the cutting edge of the tool, the result is a cooling effect which cannot be equalled by any other method.

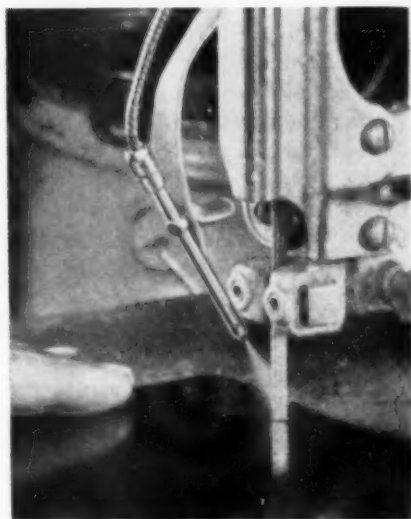
Heat absorption is dependent on pressure rather than volume. It is possible to do more with a small amount of high pressure than a wide stream of air at low pressure.

It is safe to say that 90 percent of all machining operations can be done in the average shop with mist cooling. As far as automatic screw machining operations are concerned, the run, of course, should be long enough to justify the time involved in setting up.

This method of cooling has many advantages over conventional methods of flood cooling. With the latter, heat is removed from the chips



**Nozzle directs mist spray** for single point turning tool from below.



**Contour sawing** is done without chips covering layout lines. Speed may be increased 50% without heating and with longer blade life.



and transferred to the liquid. When a mist is employed, cooling is on the tool and workpiece only, not the chips. Mist can remove heat from the tool as fast as the heat is generated. The nozzle can be placed so that the spray is directed to the underside of a curled chip.

Clean, uncontaminated coolant is always used. Coolant is not recirculated or reclaimed so pumps, filtering systems are not needed. Neither are coolant reservoirs necessary. The mess, usually associated with flood cooling, is eliminated with the result that the operator's hands and clothing remain dry. With splash guards unnecessary, the work can be loaded faster with improved visibility.

All that is required to put a mist method of cooling into operation is a simple hose connection from the air line and a supply of coolant. No regulator is needed, no pressure tanks, floor stands, filters, fittings or tubing. A magnetic nozzle holder makes location and adjustment of the mist simple and secure for temporary installations.

#### **Advantages of Mist Cooling**

Users of mist cooling report the following advantages with respect to various types of applications:

**DRILLING MACHINES**—Chips are blown away from work and mist is forced down drill flutes to cutting edges. Deeper holes can be drilled without pull out.

**SURFACE GRINDERS**—Reduces loading of wheels. Prevents breakdown of form-dressed wheels, checking of hardened steel, and prevents warpage of work.

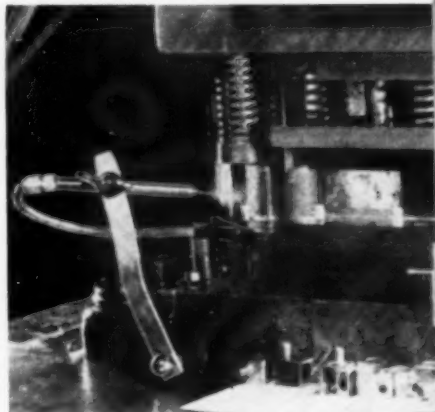
**JIG BORERS**—Eliminates haphazard brush application of coolant. Allows closer tolerances with better finishes.

**ABRASIVE BELT GRINDERS**—Reduces loading of belts. Work is kept cool.

**TOOL ROOM LATHES**—Allows heavier roughing cuts, finer finishes and closer tolerances without flooding the machine.

**OFFHAND GRINDING AND SNAGGING**—Reduces wheel loading. Eliminates cooling in the water pot.

**CONTOUR BAND SAWS**—Keeps scribed lines free of chips for closer



**Cooling of high speed dies, never before possible, is now practical. As much as 500% increase in die life is reported.**

work, work is kept cool, allows higher blade velocity for faster cutting.

**VERTICAL MILLS**—Keeps cutter and work free of chips, produces better finishes with longer tool life.

**POWER HACK SAWS**—Increases blade life up to 80% over dry cutting.

**TAPPING**—Blows chips from the tap. Supplies constant lubrication. Keeps taps cool. Taps hold size. Time required to drain and wipe tapped parts is saved. Speed increased 35%.

**BORING MACHINES**—Makes close tolerances easy to maintain since work does not heat up. Better finishes because coolant reaches tool.

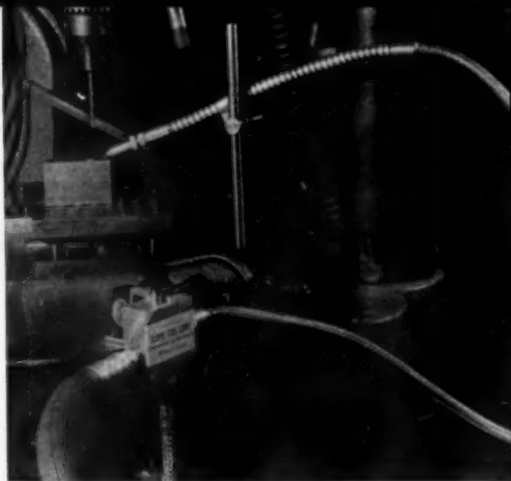
**PROGRESSIVE DIES AND DIEING MACHINES**—Tremendous increase in parts per grind. Parts are burr free, galling and pick up eliminated or greatly reduced.

**MILLING MACHINES**—Increased cutter life. Carbide tipped cutters running too fast for flood can now be cooled and lubricated.

**HAND SCREW MACHINES AND SECOND OPERATION MACHINES**—Greater tool life, complete visibility of work, elimination of splash guards.

**DIAMOND WHEELS**—Wheel life increased a minimum of 100% over dry grinding. Complete visibility of work at all times. Wheels cut faster.

**INTERNAL GRINDERS**—Greatly reduces loading of small mounted wheels. Keeps work cool and minimizes distortion.



**Screw adjustable** nozzle of Lloyd Tool's Koolmist can be regulated with such a fine pin point mist spray it is invisible to naked eye.

### **The Central System**

The established efficiency of individual installations has resulted in a gradual development of centralized coolant systems. Groups of machines are equipped with mist cooling, the coolant mixture being supplied from a single source.

Each machine is provided with a liquid and air control valve permanently mounted on the machine convenient to the operator. The operator has immediate, separate control of the air volume and moisture content of the mist at all times.

The coolant tank is mounted above the highest nozzle level, so that the coolant can be supplied from the tank to the control valves by gravity through permanently installed tubing or pipe. The air supply line is also permanently connected to the valves by tubing or pipe from the shop air line.

Practical Arbitration, Time Study  
and Work Simplification Part IV

## How Do Work Standards Hold Up



- 2 Cases:**
1. *Increased Work Load Required of a Day Work Operator*
  2. *New Inspection Rate Challenged*

● Because of the technical nature and the importance of work standards, companies and unions are usually cautious (a) about arbitrating standards and/or (b) about their selection of an arbiter once a decision has been made to arbitrate a standards dispute. In an increasing number of cases, parties to a work standards dispute are demanding that arbiters step out onto the production floor and gather their own data when there are wide differences in the data and claims made by both sides. Obviously, if a company feels this should be done (and the union

concurs), this arbiter time-study skill requirement should be made known to the American Arbitration Association or to the Federal Mediation and Conciliation Service *at the time the parties request a list of suitable arbiters.*

### **1. Increased Work Load Required of Day Work Operator**

*Issue:* Is the Company right in asking its day-work screw machine operators to service two machines instead of one machine?

*History and Background:* This company makes screw machine parts for the air-airplane industry. Most of its steady repeat items are

## in Arbitration ?

By **Harold R. Nissley, P. E.**  
Consulting Engineer

on incentive. However, the job in dispute is not a repeat item and hence is on day work.

The base pay for non-incentive operators is \$1.70 an hour. Good (normal) incentive operators average \$2.00 an hour. All incentive operators operate three machines. Day work operators tend but one machine.

The grievant operator in the present case does manual work during one-third of the man-machine cycle time. He loads his machine; he checks an occasional part for size and finish; and he replaces a filled tote pan. This consumes 3.5 minutes out of a total of 12 minutes per cycle.

*Union's Position:* Historically this has always been a one-machine-per-operator job. To ask an operator to take another machine without rewarding him cor-

Mr. Nissley discusses two work standards or incentive cases in the present article. Although these cases may differ from particular cases the reader has in mind, the methods of attack are worth studying for any person who may be interested in exposing his work measurement techniques to outside engineering scrutiny. Thus, if the reader has a work standards dispute going to arbitration, he might compare his "trump cards" with the "trumps" which follow.

respondingly is a speed-up of the rankest sort. Obviously, if an operator receives \$2.00 an hour for tending three machines, an operator tending two machine should receive at least \$1.85 an hour.

*Company's Position:* The Company rests its case on the provisions of the Labor-Management Agreement which says in part: "Employees are expected to give a fair day's work for a fair day's pay." And "Management reserves the right to set work standards for any job covered by this contract; and the Union has the right to grieve against any work standards which it deems unreasonable."

There are, therefore, two questions that should be answered before a decision can be rendered on the foregoing issue: (1) Does a work assignment which involves two-thirds of an operator's time

***The arbiter was not asked to verify Company time-study figures***

instead of one-third of his time constitute an *unreasonable* assignment? (2) Is \$1.70 an hour an oppressive wage for day work screw machine operators?

The Company points out that it never puts a job on incentive until the work content on that job approaches the effort and work content of jobs already on incentive. Indeed, in the present instance, the Company feels that it is grossly over-paying day-work operators (at \$1.70 an hour) when they exert themselves only one-third of the day.

But the hourly rate on this job is really not within the legitimate purview of the Arbiter. The hourly rate on this job is well covered by (a) the negotiated Job Evaluation Plan and (b) the latest Labor-Management Agreement. The Job Evaluation Plan which was adopted by the Company and the Union two years ago puts the screw machine operators in a Class III job classification. The current contract stipulates that all Class III jobs shall carry a base rate of \$1.70 an hour (see table of wage rates at the end of the Agreement). Thus, for the Arbiter to set any other rate on this job besides the \$1.70-an-hour rate which the parties agreed to would be going outside

the province of this arbitration and would, in effect, be setting aside the contract. The real issue, then, is: Is the addition, of another machine bringing the operator's work load up to 2/3 of a day's work (instead of 1/3) "unreasonable"?

**Arbiter's Opinion and Award:** Many industrial engineers (and arbiters) have attempted to segregate work and money. They argue that a fair day's work is one thing; a fair day's wage is something else. This position has some merit. But its rigid application leads to as many misunderstandings as the separation of product and price in other matters. For example: One might say a new car buyer who just paid \$8,000 for a car got a bargain; but he could only say this after he learned more about the car (in this case, a new \$15,000 Rolls Royce). In another instance one might think a car buyer was gyped when he paid \$200 for a car (a 1947 convertible in poor condition).

The Arbiter was asked to decide: "Is the Company right in asking its day-work screw machine operators to service two machines instead of one machine?" Because the key word to the issue is "right" it might be well to focus attention on this word. Webster's New In-

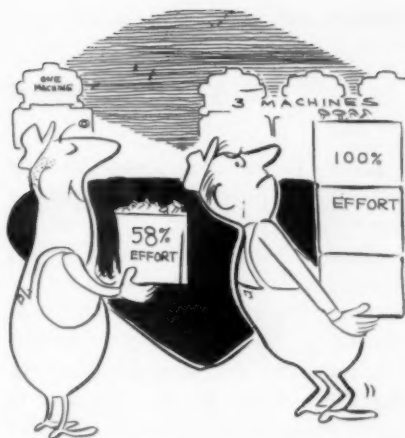
## out on the production floor

ternational Dictionary (1958 edition) offers the following synonyms for "right": "equitable; fair; true; appropriate; faultless."

To be sure the present labor-management agreement sets the day work or base rate for screw machine operators at \$1.70 an hour. Historically one screw machine operation has been accepted by the Company as "day work." Historically the operation of three screw machines by the Company has been considered incentive work. Historically, nothing has been done about 2-machine operation.

Because the equities in the present dispute are intimately tied up with wage rates the Arbiter cannot disregard this Siamese twin of the work-content and pay combination. The Arbiter, therefore, rejects the Company's claim that the wage rate for this job is outside his province in the present dispute. Indeed, there would be no dispute nor arbitration, if the wage rate were adjusted to the satisfaction of the grievant screw machine operator.

On the other hand, if the Union accepts the principle that 100% incentive effort should receive 100% incentive pay, then it is incongruous to say that 58% incentive effort (2 x 3.5 minutes divided by 12 minutes) should re-



"... to grant relief to an operator exerting 2 percent less effort would be unfair."

ceive 92% of Incentive pay (\$1.85 divided by \$2.00).

If the Company had asked this screw machine operator to devote 90% or 95% of his available working time to physical or mental effort, then some relief would seem reasonable. But to grant relief to an operator who is exerting 42% less effort (100%-58%) than the effort exerted by normal incentive operators would be unfair in two respects: (1) The Company would be paying, in effect, 92c for a 58c item. (2) Other screw machine operators delivering 100% effort (operating 3 machines) would find it hard to rationalize a 92% incentive payment for 58% incentive effort (compared with their 100% over 7½ hours).

The Arbiter must, therefore, deny any relief to the grievant operator. The Arbiter's award is in favor of the Company.

## 2. The New Inspection Rate is Challenged

*Issue:* Is the new incentive rate for the RS Speed Reducer a proper rate?

*History and Background:* This Company manufactures a wide range of speed reducers (and transmissions). The small highly repetitive reducers are assembled on an assembly line. Each reducer is given exhaustive tests particularly after its final assembly.

The present dispute arose from the establishment of an incentive rate on the final inspection job of a new (high volume) reducer the company developed to meet domestic and foreign competition. The inspector is required to make many of the same tests that he makes on other (low-volume) speed reducers. But the high volume of the RS speed reducer justified the expense of some combination tools and special gages so that an inspector is now expected to inspect 70% more speed reducers than formerly.

The labor-management contract has this to say about incentives: "A normal incentive operator, working consistently through his shift at a normal incentive pace, will or should earn 30% incentive bonus over and above his base rate of pay." In another part of the contract there is this: "Work standards for incentive operators

will be set so that a normal operator working at incentive pace will earn, without undue strain or fatigue, 30% bonus above his base pay."

*Union's Position:* The inspector on this job is an old time inspector with over 10 years of inspection experience (5 years on final inspection of speed reducers). His average incentive earnings for the past two years, before he went onto this new job, has been 40%. But on this new job he can only earn 15% bonus. In other words the Company expects this man to do the same amount of work now for \$2.30 that he formerly did for \$2.80 an hour.

The Company will say that this inspector's earnings have dropped because he is not exerting himself fully. We say he is losing 50c an hour on this job for three reasons: (1) Unsteady flow of work thereby depriving him of incentive opportunities; (2) frequent rejects and re-works and (3) tight work standards. We can and will document each of these claims.

*Company's Position:* The base rate on this job is \$2.00 an hour. An inspector exerting full incentive effort should, therefore, make \$2.60 an hour. So we are talking of a 30c hourly difference in this man's expected earnings and his



actual current earnings—not 50c an hour as the Union claims.

The Union says the flow of work is unsteady. Because this is a new model we have made extra provision for this by incorporating an extra (temporary) unavoidable delay allowance of 5% (24 minutes over an 8-hour shift). All of our incentive operators have down-time cards which they ring out whenever a delay of more than one minute occurs. During such down time the contract calls for paying a man his base pay—in this case \$2.00 an hour. A recent check of the down time on this final inspection job over an 8-hour period indicated the down time to be 15 minutes—not 24 minutes as we originally had estimated.

The Union complains about the number of rejects and re-works. We know the number of re-works is greater in most new models so we made another 10% allowance for this factor (48 minutes a day). On our recent 8 hour check we found it took 55 minutes for rejecting or re-working defective reducers on the RS model.

The Union claims that our work standard on this job is tight thus resulting in sharply decreased



earnings. We think we have leaned over backwards in setting the work standard on this job. We borrowed 30 elemental time values (out of a total of 45) from previous similar jobs; indeed, most of these 30 common elements were derived from time studies made on the grievant operator before he took his present RS inspection job. Only 15 non-comparable elements have newly established time values.

Thus we feel that this inspector is holding back until we loosen the piece rate on this job. Obviously, he is not putting forth the same effort as formerly, otherwise he would be making \$2.60 an hour instead of his present rate of \$2.30.<sup>1</sup>

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<sup>1</sup>Because of the disparities in the conclusions drawn by the parties in this case the writer welcomed the suggestion (by both parties) of stepping out onto the production floor and making his own time study observations. The first day of these 8-hour studies the writer clocked 30 minutes of down time compared with the Company allowance of 24 minutes); the second day disclosed 38 minutes of unavoidable delays. But the re-work

*Arbiter's Opinion and Award:* After each 8-hour time study by the Arbiter he asked the Company and Union representatives for their appraisal of the skill and effort demonstrated by the inspector during the 8-hour day (the Arbiter's observation sheet notations for this rating factor were in the 100% range). The Company estimates ranged between 85% and 95%; the Union estimates ranged between 110% and 120%. Hence the Arbiter's 100% rating was a trifle below the average of these widely differing ratings of the Company and Union representatives.

At the start of the time study observations the Arbiter asked the grievant inspector to call to the Arbiter's attention any unusual conditions, if and when they occurred. (The Arbiter had previously admonished the Company and Union representatives to do the same.) Only one unusual con-

dition was called to the Arbiter's attention during his two days of observations. One of the Union Stewards pointed out that according to the detailed Company elemental description the inspector should be using a fast-acting ratchet wrench for a difficult inside adjustment; instead the inspector was using a slow open-end wrench for this adjustment. When the Arbiter asked the inspector about this deviation from Company instructions his reply was: "Someone swiped my ratchet wrench and the Company refuses to furnish me with another."

Because the grievant inspector averaged only 16% bonus during the two days of time study observations by the Arbiter (in the presence of non-protesting Company and Union observers); because of the implied accuracy of the Arbiter's time study techniques and conclusions (due to his 99% agreement with the Company's 30 common or bench-mark elemental

---

times checked closely with the Company's 48 minute allowance for this item (45 minutes one day and 55 minutes the second day).

Of greater interest was the elemental time comparisons. Fortunately the writer followed the Company's element job breakdown. Although individual elemental times varied by as much as 25% in some of the 30 "borrowed" elements, the total of the writers 30 borrowed (or common) elements matched the Company's total for these same 30 elements by a surprising degree; the writer's total allowed time for these 30 elements was 15.27 minutes; the Company's allowed time for these elements as 15.41 minutes—a difference of about 1%. But the writer's allowed time for the other 15 elements was nearly twice the total allowed time of the Company!

times); because the Arbiter's production standard is 11% less than the Company's (due largely to the wide disparity between the Arbiter's allowed times for the 15 new elements compared with the Company's allowed times for the same 15 elements); for these and other reasons the Arbiter rules the new incentive rate for the RS speed Reducer is not a proper rate.

To convert the Company's new incentive rate for the RS speed Reducer into a proper rate under current operating conditions, the present rate on this job must be multiplied by 1.12 to bring it up to the contract level of 1.3 (or 130%) of the base rate. Thus, this 1.12 multiplier, if applied to the average 16% bonus earned during the two days of time study obser-



"... to make the Company's new incentive rate a proper rate."

vations by the Arbiter, should yield a 30% bonus for those two days.

The Arbiter, therefore, awards in favor of the grievant operator.<sup>2</sup>

• • •

<sup>2</sup>A subsidiary consideration in this arbitration was the matter of retroactive pay for the grievant inspector. The contract was not clear on this point indeed, (the contract said nothing, directly, about retroactive pay for piece work operators). Moreover, the parties did not mention the matter of retroactive pay during their presentations; obviously it does not appear as an issue presented to the Arbiter. The Arbiter was, therefore, reluctant to bring up the matter of retroactive pay during the hearing lest the Company think he was prejudging the case. For these reasons the Arbiter did not include the matter of retroactive pay in his award. However, he was subsequently asked to rule on retroactivity. Here was his ruling:

Retroactive pay is due the grievant inspector. The amount of retroactive pay shall be calculated by multiplying his income during the dispute period by a factor of 0.12 which represents the difference between the 112% piece rate adjustment figure alluded to above and the 100% pay which the grievant actually received. The dispute period may be defined as the time between the first day the grievant worked on the RS Inspection job and the day the foregoing 1.12 adjustment in the present piece rate is put into effect (and shall include the first day on the RS Inspection job).

## Long Range Outlook for Man-Made Diamonds

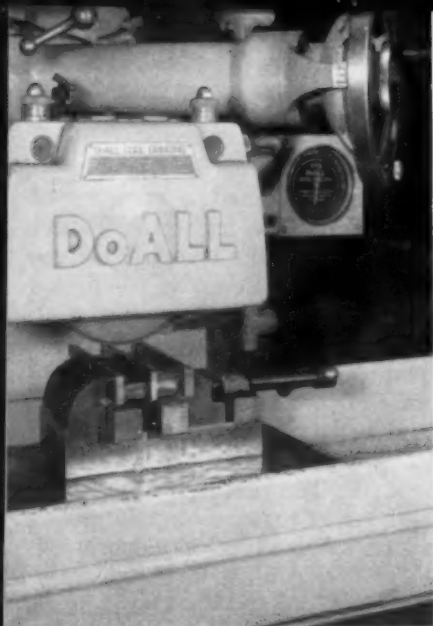
Tangible evidence points to greater use of MD's

By **Chester A. Nisula**, Product Manager  
Simonds Abrasive Company

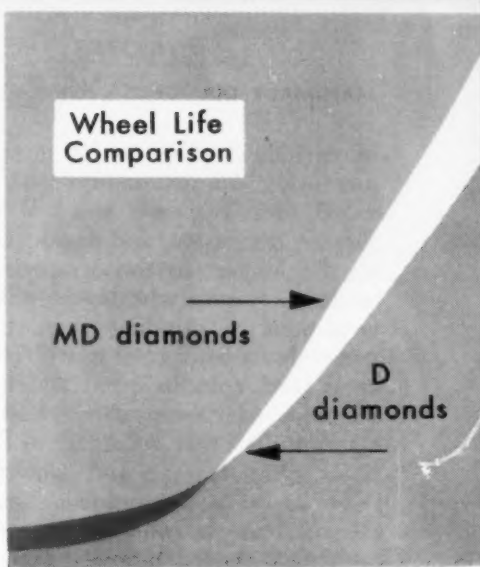
● Both laboratory and field tests have been conducted during the past year by Simonds Abrasive Co. to determine the comparative value of man made diamonds in relation to natural diamonds. Following the usual practice, the laboratory tests, under rigidly controlled conditions, came first. This was to give an indication as to what might be expected under production conditions in the field.

In our laboratory, surface grinding tests were conducted under completely automatic controls. Figure 3 illustrates the grinding machine, work piece and accessory equipment. On the surface grinder was placed a Type DIA1, 6 x  $\frac{3}{8}$  x 1 $\frac{1}{4}$  diamond wheel of the general specification D (or MD) 100-N100-B  $\frac{1}{2}$ . With flood coolant (120 to 1 soluble oil), this wheel ground a solid piece





Volume of Wheel Wear-increases



1. **Set-up** for intermittent grinding tests to compare MD with D diamonds.

2. **Curves** are plotted volumetric wheel wear versus down feed as measure.

3. **Set-up** for grinding solid piece of carbide under automatic controls.



of carbide—surface to be ground measuring approximately  $1-63/64 \times 4-11/16$ . Traverse was on the shorter dimension and cross feed on the longer. In the comparison made between wheels, identical conditions of grinding (*e.g.*, traverse, down feed, total down feed, cross feed, spindle speed and traverse speed) were used. Power consumption was recorded at all times. Wheel wear and material removed were determined. Thus, the variables were limited but easily measured. Data obtained was then converted or utilized in terms which are common to industry.

At this point it would be well to stress a most important fact. Since this test was under ideal conditions (no operator error, etc.), the actual values are not important, but the relative values obtained from MD (man-made) and D (natural) diamonds are. For example—if even under controlled conditions table speeds were changed, a completely different set of data would have been obtained, but the relative values of MD and D diamonds would be similar to those reported. Therefore, it was deemed best to show trends rather than actual data. Figure 2 shows the comparison made concerning wheel life. These curves are plotted volumetric wheel wear versus down feed as the measure of wheel life. Since at each and at all levels of down feed total down feed was

the same, volumetric wheel wear can be considered a measure of wheel life. The higher the wheel wear, the less the wheel life. Here it was noted that under conditions of the test, MD diamonds were superior to D diamonds when down feed was equal to or near the recommended level. General practice has dictated that down feed for 100 grit should be near 0.001" per pass. Under machine (positive) feeds as in these automatic grinding tests, this superiority continued up to 0.002" down feed. This observation indicated that under hand feeding conditions or when small pieces being ground, etc., the cross-over point of the two curves could move to the right 0.003" or 0.004" or more.

Similarly, if table speed were increased, the cross-over point could be moved to the left. Changes in other factors could also have similar effects. However, as down feed increases, grinding pressure on each individual diamond particle increases. Considering this fact, when observing Figure 3, leads to the observation that any condition leading to excessive pressure is detrimental to gaining maximum useful work out of a wheel containing MD diamonds. Of course, this is also true of D diamonds, but it is not as pronounced.

In any completely automatic grinding such as this, cutting ability (or rate of cutting) is re-



# Questions and Answers about ELCIDE 75

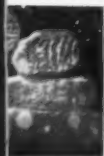
*Here's what you'll want to know about this new bacterial inhibitor for soluble oil emulsions:*

**What is Elcide 75?**

Elcide 75 is a new bacterial inhibitor for standard duty soluble oil emulsions. Chemically, it is a combination of Sodium Ethylmercuri Thiosalicylate (Thimerosal) and Sodium *o*-phenylphenate in a concentrated solution.

**What does Elcide 75 do?**

Elcide 75 controls bacteria that contaminate soluble oil emulsions. Since both chemical ingredients are anti-bacterial agents, Elcide 75's double action controls a far wider range of bacteria than the commonly used germicides.



bacteria like these can spoil emulsions. Elcide 75 stops their damage.

**Why is bacteria control important?**

Bacteria enter emulsions through the air, water, and plant debris. They multiply rapidly and cause odor, corrosion, and premature emulsion breakdown. This compounded damage costs millions of dollars each year in higher maintenance and production costs. Bacteria control reduces these expenses.

**How does Elcide 75 lower costs?**

The use of Elcide 75 can increase emulsion life as much as 5½ times. You use less soluble oil. Fewer man-hours are spent servicing machines and disposing of waste

oil. And, because machines run longer between emulsion changes, production is increased proportionately.

**Q: What is the exact dollar return from Elcide 75?**

A: No exact figure can be established because conditions vary between plants. The type of metal, machines, and operations involved, the coolant, and general plant housekeeping are all factors that help determine savings due to Elcide 75. The best way to measure its value is to try Elcide 75 and compare the results with untreated machines in your plant.

**Q: How is Elcide 75 used?**

A: One ounce of Elcide 75 is added to each four gallons of emulsion. You know you have a safe, effective treatment because you control the dosage.

**Q: Is more data available on Elcide 75?**

A: Yes. Complete information on compatibility, disposal, stability, safety, and other pertinent factors is immediately available on written request.

**Q: Where can I buy Elcide 75?**

A: Elcide 75 is sold only through selected distributors. To place your order, or for the name of your nearest distributor, write Eli Lilly and Company, Agricultural and Industrial Products Division, Indianapolis 6, Indiana; or call MEIrose 6-2211.

*(Lilly's brand of bacterial inhibitor for cutting fluids)*

Package	Price per Gal.
1-gal. (4 per case), polyethylene.....	\$8.50
5-gallon, polyethylene.	\$8.00
55-gallon, stainless steel.	\$6.50



**ELCIDE 75**<sup>TM</sup>  
PATENT PENDING

KEEPS COOLANTS FRESH AS A DAISY!

*Lilly* AND COMPANY • AGRICULTURAL AND INDUSTRIAL PRODUCTS DIVISION • INDIANAPOLIS 6, INDIANA



***Regardless of the level of down feed, MD diamonds consume***

flected in power consumption. Since total power was measured, and the power required for the machine was known, it was a simple matter to calculate the power consumed in actually removing carbide on each grinding pass. Reduced power consumption means that the wheel is cutting freer and faster. Higher power consumption means that cutting action is more harsh.

Figure 4 illustrates the comparative cutting ability of the two types of diamonds. Regardless of the level of down feed, MD diamonds consumed less power than did D diamonds. This indicates that in each case MD diamonds cut faster and cooler. Faster cutting and longer life may mean a more friable type of abrasive than D diamonds. (Such a comparison may be analogous to the difference between SA Borolon—a special refined, single crystal, white aluminum oxide, and WA Borolon—white aluminum oxide.)

The lower power consumption, however, does not mean reduced carbide removal. Actually, MD diamonds removed more carbide on each grinding pass. This was illustrated when power consumption for clean-up passes was compared. A definite and marked reduction in power was required for the clean-up passes with MD diamonds.

This means less carbide remained to be removed after actual grinding passes with MD diamonds.

The reduced power consumption produces another very important result for any carbide consumer. The power used is consumed more in grinding than in developing heat. The less heat formed, the less the chances for cracking (or heat checking) of carbides. The combination of MD diamonds and the more recently developed aluminum powder-filled plastic core (for rapid transfer of heat) safeguards the carbide being ground.

The series of controlled grinding tests showed other characteristics which are of interest to diamond wheel consumers:

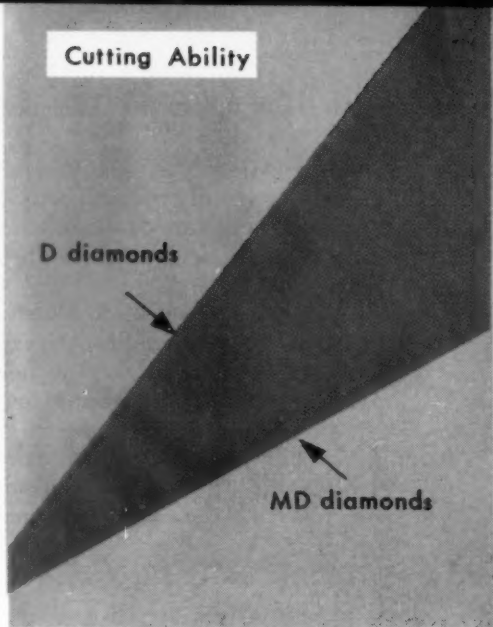
1. MD diamonds were easier to dress and to restore the wheel to true rotational form.
2. Though not as important, MD diamonds consumed 1/5 to 1/7 as many dresser wheels as did D diamonds.
3. The finish obtained on carbide at or near recommended feed with MD diamonds was equal to or better than D diamonds.
4. As down feed increased, surface finish with MD diamonds became rougher than with D diamonds.
5. Noise level of MD diamonds was lower than D diamonds.

## ss power than D diamonds

- Many consumers use such a property as a measure of cutting action.
6. Because more power was converted to useful work with MD diamonds, the resin bond did not char as readily as with D diamonds.
  7. This test included down feeds far beyond what was recommended in order to simulate the extreme of completely off-hand grinding. Based on this test, it appears that of all grinding operations, MD diamonds have the least chance of success on off-hand operations.

With the laboratory tests out of the way, it was desirable to check these findings under production conditions. Fortunately, it was possible to conduct the field tests in a number of plants and tool shops where conditions were varied. Some of these production grinding tests were very detailed but in order to protect these consumers' production data, the reports are in terms of number of pieces or percentage figures. Once again the important thing is the comparison, not the actual data. It should be mentioned, however, that the wheels containing D diamonds were from several vendors including ourselves. Those containing MD diamonds were of Simonds

Power Consumption per Pass-increases



Down Feed-increases

4. Comparative cutting ability of the two types of diamonds, MD and D.

Abrasive manufacture.

One of the earliest tests conducted utilized a tool and cutter grinder. The general wet grinding specification of D180-N100-B  $\frac{1}{2}$  was used. For this grit size we normally recommend that down feed be 0.0005" per pass. This consumer normally used more than was recommended. In fact, various feeds on the numerous shapes being ground were used in the following production evaluation. Table I illustrates the results.

Table 1 definitely confirms the laboratory tests that MD diamonds are superior when used at or near the recommended down feed. Yet when down feed increases, the limitations of MD diamonds be-

come apparent very readily.

Some typical performance reports on man-made diamond wheels in resinoid and vitrified bonds are shown in Table 2.

This merely serves to illustrate that one or another property of a new product can be used to benefit the profit picture of any sound organization.

Another test report was obtained where no vendor or consumer company staff member personally

Table 1 Effect of Down Feed on Wheel Life		
Down Feed	Life	
D Dia.	MD Dia.	
0.0010	100	207
0.0025	100*	153
0.0025	100*	107
0.0030	100	138
0.0035	100	127
0.0045	100	80
0.008	100	54

\*Note: Not the same wheel

TABLE 2

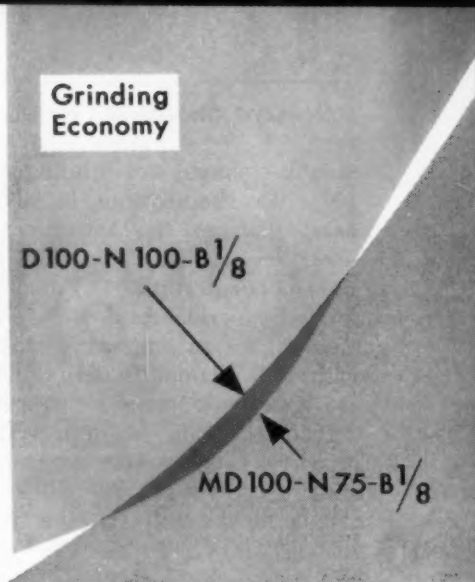
Source	Operation	Wheel Specifications
New England textile winding machine manufacturer	Sharpening carbide-tipped large cutters	MD120-M75-B 1/8, Shape D11V9 5" x 1 1/4" x 1 1/4"
Comment: 75 concentration MD equals 100 concentration diamond.		
Detroit cutting tool manufacturer	Sharpening carbide-tipped reamers and drills	MD150-R100-B 1/16 Shape D11V9 5" x 1 1/4" x 1 1/4"
Comment: Longer life than natural diamond wheel.		
Michigan cutting tool manufacturer	Sharpening solid carbide keyway cutters and end mills	MD180-N100-V 1/4 Shape D1A1 4" x 1/4" x 3/8"
Comment: Superior to natural diamond wheels.		
Los Angeles saw sharpening shop	Resharpening carbide-tipped circular saws. All-over grind, two sides and top.	MD180-N100-B 1/4 Shape D11V9 5" x 1 1/4" x 1 1/4"
Comment: Sharpened 45% more tips than natural diamond wheels.		
New Jersey laminating die manufacturer	Internal grinding carbide dies	MD180-N100-B 1/4 Shape D1A1 1 1/2" x 1/4" x 1/4"
Comment: Longer life and faster cutting than natural diamond wheel of same size.		
Midwest farm implement manufacturer	Sharpening carbide-tipped cutters	MD320-N100-B 1/16 Shape D11V9 5" x 1 1/4" x 1 1/4"
Comment: 35% more efficient than natural diamonds.		

observed the grinding operation of carbide resharpening. The foreman gathered the weekly production reports of wheels containing MD and D diamonds. Wheels containing these two types of diamonds were used alternately, with the operators involved having no idea of the difference. This meant that down feed could vary as could all other variables (however, the operator was not on incentive pay). Here MD diamonds in resinoid and vitrified bond are superior to natural diamonds. Wherever this superiority has not shown up, the reason in each case has been the same—excessive pressure on each diamond particle. In one sense, it makes no difference to the manufacturer; he has both available. On the other hand, each manufacturer is interested in giving his customers the product which will produce the best results. Properly used, MD diamonds will put money into any user's pocket.

All of the above results serves to illustrate that, properly used, MD diamonds in resinoid and vitrified bond are superior to natural diamonds. Wherever this superiority has not shown up, the reason in each case has been the same—excessive pressure on each diamond particle. In one sense, it makes no difference to the manufacturer; he has both available. On the other hand, each manufacturer is interested in giving his customers the product which will produce the best results. Properly used, MD diamonds will put money into any user's pocket.

Because of the original laboratory tests, the value of 75 concentration MD diamonds also was considered. To satisfy this curiosity, a similar controlled and automatic laboratory grinding test was conducted. This time it was felt that intermittent cuts would be more conclusive. Figure 1 shows the "work" set up for this test. It must be mentioned that the traverse across each of the three pieces was such,

Wheel Cost-increases



Down Feed-increases

5. Wheel cost as determined by dollars per cubic inch of carbide removed.

that the time between the beginning and the end of each traverse before and after each piece was the same as between each piece. Wheel size and other grinding conditions were for all practical purposes the same as the previous test.

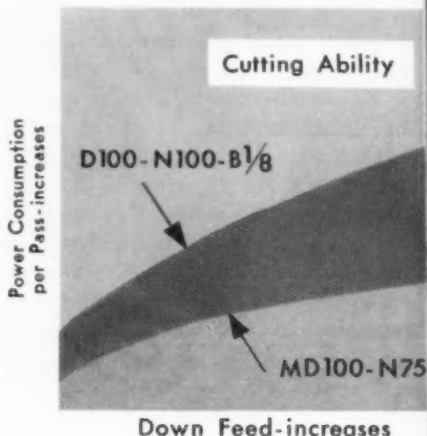
Since the economical factor of wheel cost now comes into the picture, we do not present life in terms of loss of wheel volume loss but wheel cost as determined by dollars per cubic inch of carbide removed. Figure 5 illustrates this. Note that under the conditions of this test, based on wheel cost alone, it may or may not be more economical to use 75 concentration MD diamonds rather than 100 concentration D diamonds. This test, once again, utilized 100 grit dia-

monds—general wet grinding grade (N). We should note, in all fairness, that at the recommended down feed in this controlled test, 100 concentration D diamonds proved superior. As down feed increased, for an interval, wheel life with MD diamonds definitely increased. Once again we must say that this period of improvement in wheel life can vary from operation to operation. Yet wheel life cannot be the only criterion when cutting ability of the two types of diamonds and the two concentrations are considered.

Figure 6 shows one of the most amazing grinding characteristics our laboratory has ever seen. After reducing diamond concentration to 75 with MD diamonds and comparing with 100 concentration D diamonds, the former proved to be freer and faster cutting. This is illustrated by power consumption (for grinding purposes only) per pass of MD100-N75-B  $\frac{1}{8}$  and D-100-N-100 B  $\frac{1}{8}$ . The only explanation that can be given for the freer and faster cutting rate of 75 concentration MD diamonds over 100 concentration D diamonds is that under intermittent cut or down feeds of short duration the more friable characteristic of the former prevails. The wider spacing of MD diamonds seems to give each friable particle more chance to function efficiently. This does not infer that 50 concentration MD diamonds would be

even better than 100 concentration D diamonds. As a matter of opinion, this would probably not be true.

To date, field tests of 75 MD diamonds versus 100 concentration D diamonds have not been too conclusive. In cases where pressures have been very excessively



6. MD diamonds (75 concentration) proved to be freer and faster cutting compared to 100 concentration D diamonds.

over recommended, 75 concentration MD diamonds have not been superior. Yet, reports have also been received where 75 concentration MD diamonds have proven equal to or better than life and cutting ability of D diamonds.

The user, of course, is the final judge of the value of any product to him; only he is really in position to judge the weight of the various factors which he uses in selecting diamond wheels. • • •

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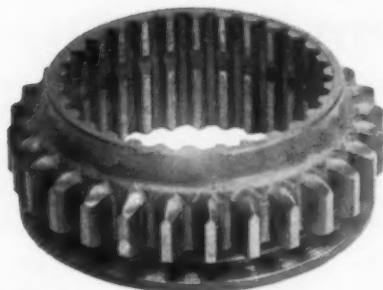
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## REPORT FROM W. GERMANY

# Gear Shaper Chamfers



1. Slide gear showing the shape of chamfer.

By **J. Siegfried Spizig**,  
Köln, West Germany

● The teeth of the transmission slide gear of Fig. 1 have to be chamfered approximately 45 deg. on the open face, to facilitate shifting. This is performed during the conventional gear shaping process by a special milling attachment. The generated teeth pass a plain milling cutter, positioned 90 degrees off-set to the disk cutter, as shown on Fig. 3. By this equipment the burr-generated in the shifter groove during shaping—will be removed continuously.

After a further quarter of a turn the first generated tooth terminates at the corner-rounding end mill op-

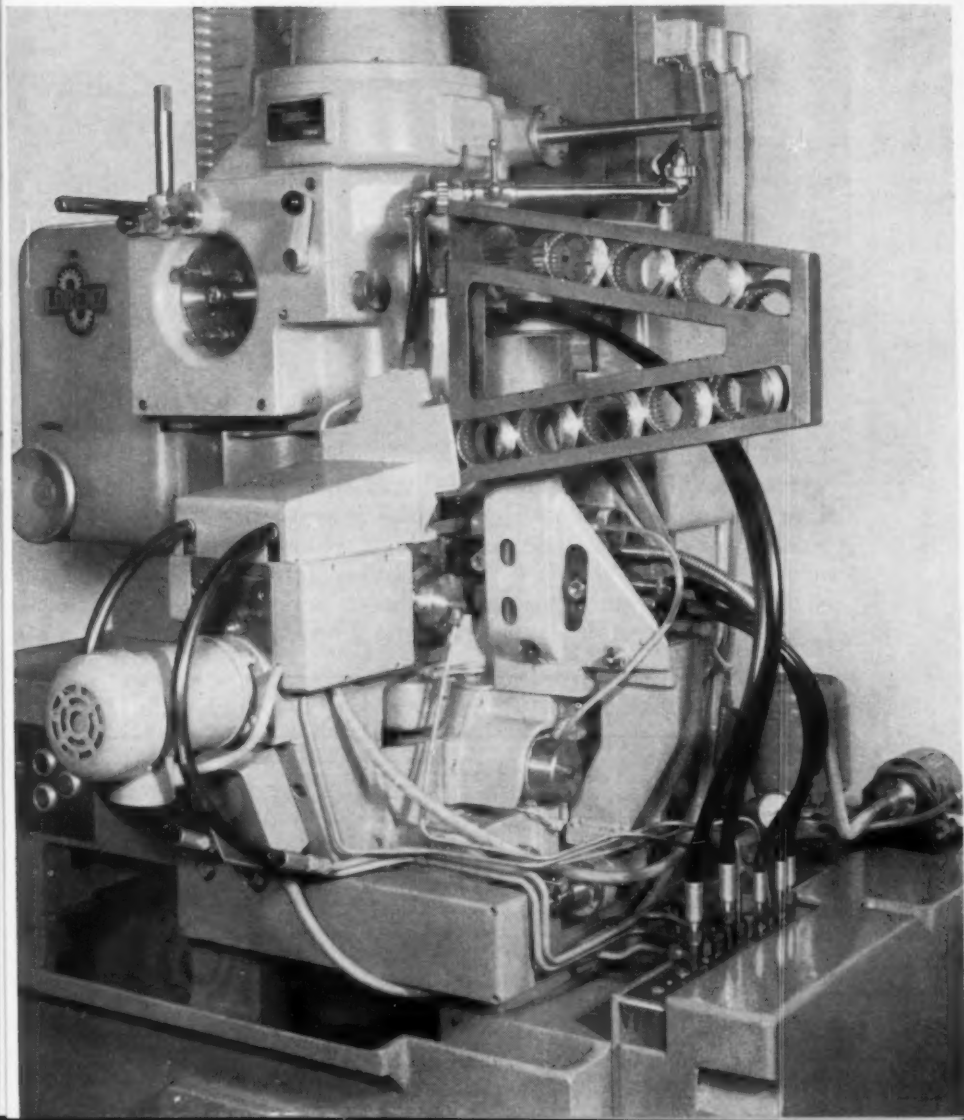
posite to the disk cutter. (See Fig. 3) The mill is then advanced by a hydraulically operated slide and locked in cutting position. A synchronized cam, driven by change gears to the work spindle, provides an up-and-down movement of the chamfer-cutter. The drive comes from the flexible shaft, coupled to an electric motor.

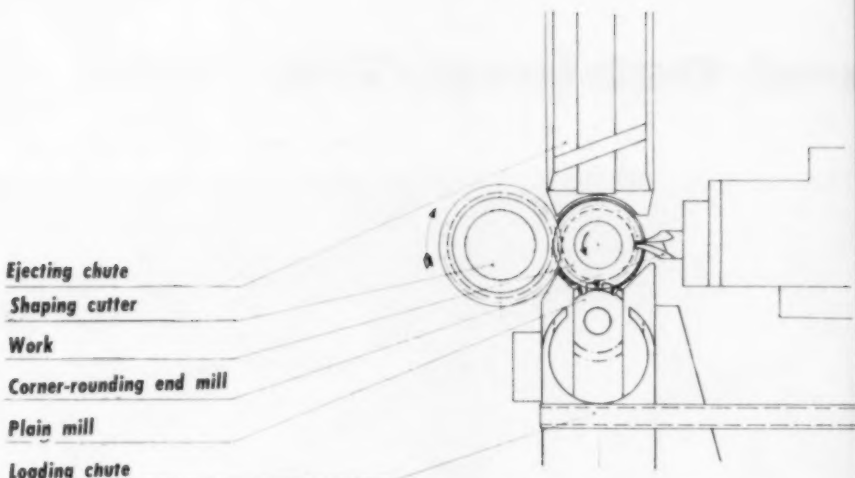
The time saving features of the chamfer and deburring attachments may be justified by the diagram, Fig. 4. Only a quarter of rotation more is required versus a normal gear shaping operation with a rough and finish cut. The latest quarter of turn, with only the deburr cutter in operation, will be rotated rapidly. Chamfering is al-



## and Deburrs, Too

2. Gear shaper with automatic loader.





3. Tool layout with shaping cutter, corner-rounding mill and plain mill in operation.

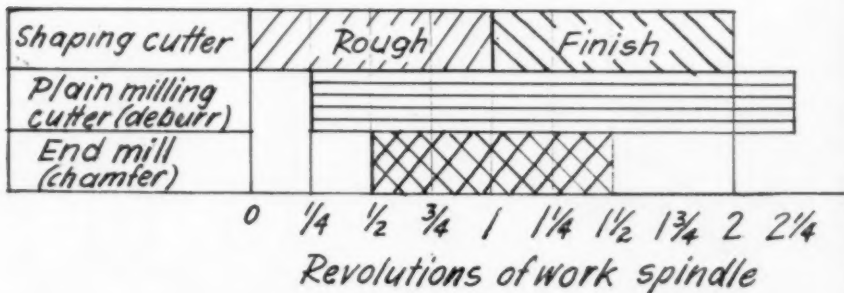
ready finished after a half rotation behind the rough cut.

Other significant savings include:

- Part handling to chamfer and deburr the gear is eliminated.
- Floor space of two additional machines is saved.
- The built-in features costs only a fraction of the cost of machinery

necessary to perform the combined operations separately.

With the automatic load and unload equipment, shown in Fig. 2, the gear shaper is a machine of high economy. It is possible to process other gears on the gear shaper or to have any attachment idle if necessary. • • •



4. Cycles of the three cutters.



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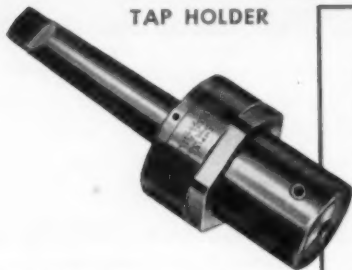
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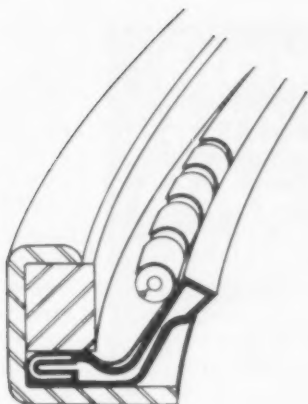
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## Proper Care of Oil Seals

**Oil seals are bearings and must be lubricated**

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● First, consider how an oil seal works. It is a device with a flexible member held in close contact under spring load against a rotating shaft. Inasmuch as the spring creates a load, the unit as a whole becomes a bearing.

This bearing is really a rather unique product. Unlike a normal bearing it does not have a fixed inside diameter. It has no running clearance. It has no provision for generating its own oil film. In fact this bearing must be designed to minimize the thickness of any film; otherwise, this film will carry too much oil out past the seal resulting

in excessive leakage.

Considerable work has been done with oil films and when one considers them in relation to oil seals, it is usual to imagine them as quite thick, especially if the 0:1 seems to be "pouring" through. Quite frankly the actual figure is not known. Attempts to apply Poiseuille's law of fluid flow to a seal would indicate clearances so small that we might say that they must be on the order of a molecule or two thick. Yet this cannot be or our seal would be quickly destroyed; thus one must follow an uncharted course of research.

The oil film must be of reason-

## OIL SEALS continued

able thickness to insure satisfactory operation of the seal as a bearing. Yet the film must not be too thick or leakage would be severe. A narrow line of bearing means less gross drag and less heat, but it also means a thinner film and more careful control. Broad contact may be all right for slow speed jobs, but even here a heavier film is likely to develop which is in the presence of fine foreign material may mean the entrance of dirt and attendant wear.

### Friction

Speaking of friction often raises the question of the co-efficient of friction of various materials. When applied to an oil seal this means little for a dry seal would not even come up to speed.

There must be at least a reasonable resemblance to fluid film lubrication or the end is at hand. The amount of friction is clearly a summation of several factors; first and foremost—the lubricant, then its temperature. Important also are shaft finish and seal finish. Seal finish is taken care of quite rapidly in the case of synthetics, provided that the shaft is not so rough as to cause excessive seal wear. The seal under normal circumstances, therefore, is quickly polished to a good bearing. Given time enough, the shaft too, is polished. With this latter combination optimum conditions are realized.

Having established good bearing conditions, this bearing must not let the shaft move radially from its own bear-

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ing contact. Not that the seal should in any wise attempt to restrain the shaft, but rather that the seal should freely float with the shaft. This requires a flexible seal, flexibility but not softness for soft materials are not particularly good bearing materials.

### Care of Seals

In considering the aspects of a seal, as a bearing, it should be realized that the seals should be handled as one. Great care is exercised not to scratch the mirror-like finish of the sleeve bearing. Care is taken to keep roller bearings clean. The seals should receive no less attention. No doubt the greatest problem lies in handling and installing the seals. In the storeroom they should not be laid on the floor, sooner or later to be stepped on and most assuredly to become full of dirt, nor should they be hung on a peg on the wall. When they are driven into the recess in the chock a good clean square edge piece of wood of fair size should be used. The actual driving should be a slow and easy job thus avoiding serious distortions or damaged lips or springs. The shaft should be smooth. The smoother the shaft, the better the seal type bearing will perform. Initial lubrication is not to be overlooked. Burrs or dents are still further by-passes. And as for helical lead or thread from machining here indeed can be an excellent pump.

### Lubrication

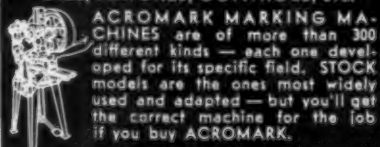
As a bearing the seal requires lubrication. With a single seal this is adequately handled by the lubricant from the bearing itself. The more critical job is where two seals are used. It has been customary to introduce lubricants between the two seals. This plan, if

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## OIL SEALS continued

set up and carefully followed, is a most important step toward obtaining reasonable seal life. Originally grease was injected between the seals at periodic intervals. On the older slow speed mills this is fairly satisfactory. There is an important consideration, however, namely: lubricant so fed to the seals will also find its way into the bearing lubricant, thus the lubricant injected should be the same as that used in bearings.

If a sleeve type bearing with oil lubrication is used, then feed oil to the seals. Should roller bearings be used with grease lubrication, then feed grease. This avoids contamination of valuable high grade bearing lubricants and yet insures the lubrication of the seals. It has been indicated that the

so-called slow speed mill set-ups are improved by seal lubrication. This is so. And if one considers some of the newer high speed mills, one would quickly learn that seal life would be very short if auxiliary lubrication were not supplied. Today, there are some oil lubricated high speed mills which have a separate oil pump metering a trace of oil to the seals continuously. This is indeed taking full recognition of the fact that oil seals are bearings and must be lubricated.

### Bearing Materials

In bearing design there is a wide choice of materials available, so that with all factors fully known quite logical selection is possible with very good assurance of satisfactory results.

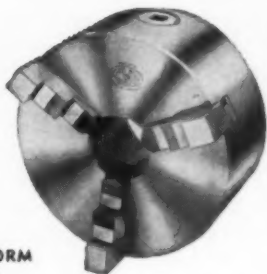
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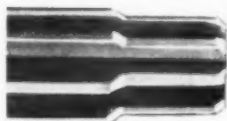
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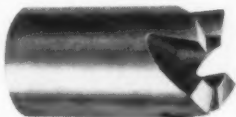
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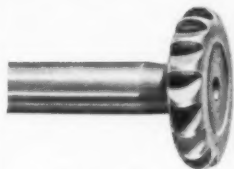
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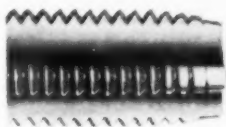
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side cutting tools



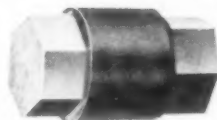
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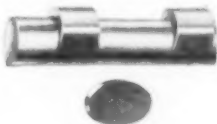
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Most bearings combine two hard materials. Usually one of these hard materials is supported in a deformable matrix such as babbitt except, of course, in the case of anti-friction bearings, or in the case of some marine strut bearings, where a soft rubber sleeve does the job. The latter case does involve a unique lubrication job with water in large volume to absolutely guarantee that there shall be no dry contact; this requires unusual design. By comparison the oil seal quickly falls into the class of a plain bearing, lubricated through capillary action by any fluid such as may be present.

It has been found that flexibility gained through softness is dangerous; an oil seal must operate on such a thin film of lubricant that failure of the film for an instant may result in seizure. A harder stock is more nearly free of this. Flexibility must, therefore,

be gained by cross section design. (Fig. 2.) Through the moldability of synthetics, it is possible to design the lip section to suit this theory, and in addition to gains in flexibility it is possible to control and restrict bearing contact. This latter step is almost impossible with leather.

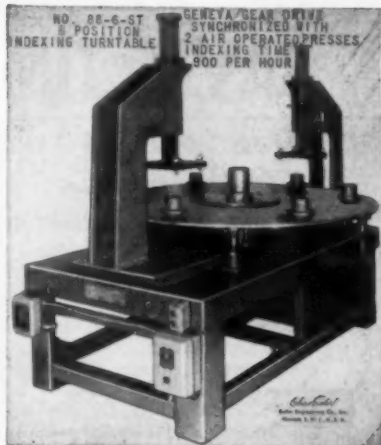
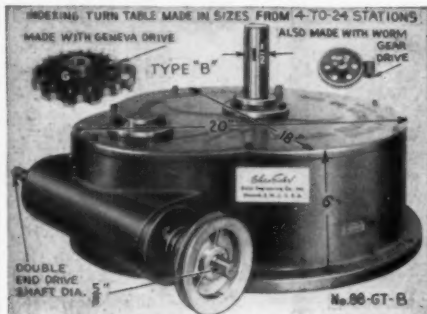
### Wear

A seal operating as a bearing will scarcely more than polish a shaft. Wear of the shaft is invariably the result of foreign material getting under the sealing lip. The nature of this wear is a lapping action, wherein the seal acts as a carrier for the abrasive. There have been some isolated cases of element wear not attributable to shaft roughness.

The cause of this wear has not been determined definitely but it appears to be due to the quantity and type

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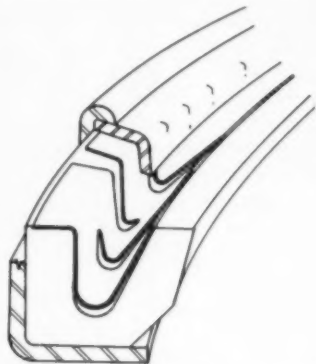
## OIL SEALS continued

of foreign material. Coarse material seems to be worse than fine dust or powder. All wear is actually, therefore, the result of seal failure; neither sufficiently close contact, nor a thin enough oil film was maintained and dirt entered.

The best solution lies in a thin film at the tip of the lip. Any curling away from the shaft, any fuzziness on the dirt side of the seal offers the necessary opening for wear to set in. In this respect, the finger spring either alone or supplemented by a coil spring.

The proper seal properly installed will give long service without repairs or replacements. There have been many improvements incorporated in such seals and yet it has not been necessary to rebuild or modify the

bearing chocks, for the basic dimensions of these seals, although compact, still leave room for new improvements to be incorporated. . . .



2. The flexibility in the seal should come from the cross-sectional design.

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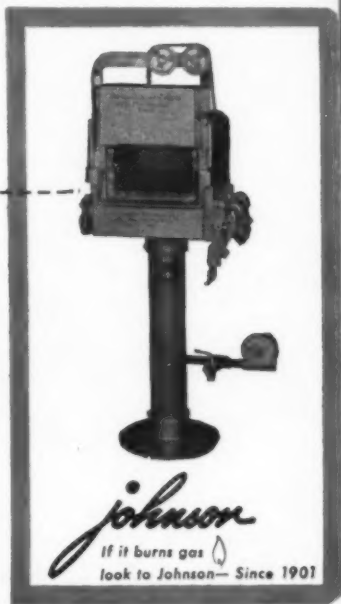
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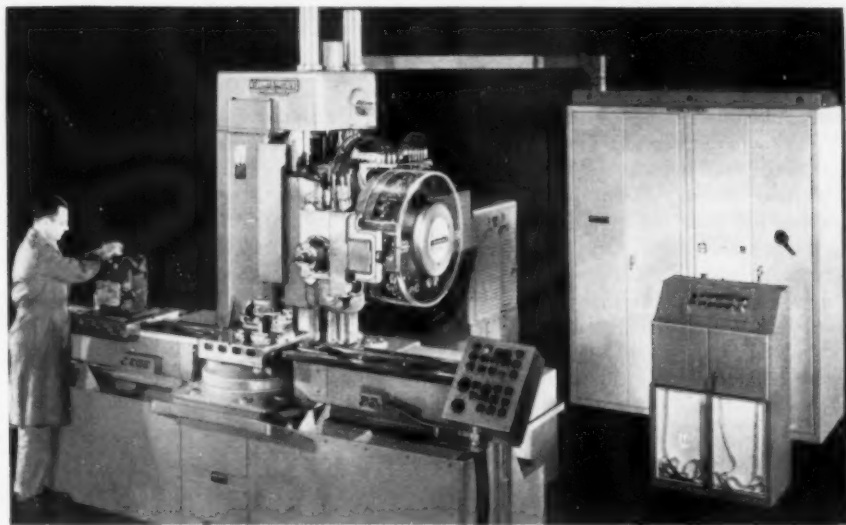
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## **Tape Controlled Combination Machine for Small Lot Manufacturer**

MILWAUKEE—A new tape-controlled combination machine, the KTNC Milwaukee-Matic, performs milling, drilling, reaming, tapping, and boring operations, thereby reducing setup time, production time, labor costs, and inventory.

By minimizing setup and positioning time and by combining milling, drilling, reaming, tapping, and boring functions in a single machine, the machine can be kept in operation "well over 75 percent of the time," according to

Francis J. Trecker, president of Kearney & Trecker Corp.

As many as 31 different tools can be loaded into the machine at one time—30 in a specially designed revolving tool storage drum and one in the spindle. There are 31 different combinations of 31 tools, ranging in size up to 2 $\frac{3}{4}$  inches in diameter, that can be utilized by the machine, making a total of 961 tools.

To make tool changes, a transfer arm automatically pivots out from its posi-

tion beside the drum, simultaneously removes the tool from the spindle and a new tool from the tool storage drum, rotates, simultaneously inserts the new tool in the spindle and the other in the drum, and returns to its normal position. Less than nine seconds are required for tool changes.

The General Electric control system makes the tool selection and directs the workpiece transfer. If the programmed tool has not been loaded into the drum by the operator, the drum will continue to revolve until it is stopped and the proper tool is inserted. Engineers pointed out that tools carry a binary code and can be placed at any position within the drum regardless of the sequence in which they are to be used. Mechanical "fingers" feel the tools and signal the control to stop the drum when the desired tool is in position to be removed by the transfer arm.

In operation, the worktable is automatically indexed to present workpiece surfaces to the spindle. The spindle moves longitudinally, vertically, and to depth. Feed rates range from 1 to 99

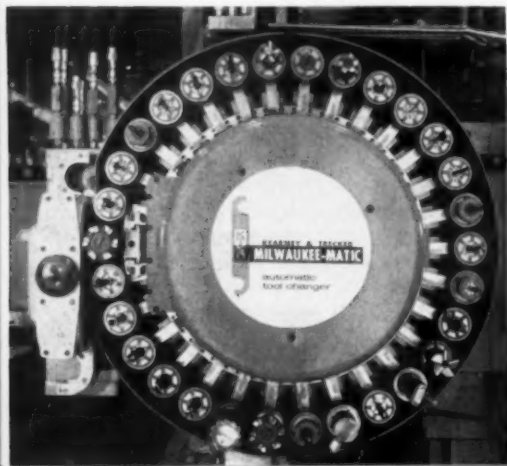
inches per minute and are selected in increments of 1 ipm. Spindle speeds from 100 to 4,000 revolutions per minute are selected in increments of 10 rpm.

As the spindle is used for tapping, a complete reversal requires 0.1 second at 100 rpm and 0.4 seconds at 400 rpm. Acceleration of the feed drives to 100 ipm is accomplished in 0.05 seconds. Where feed rates are not specified, positioning is done at 200 ipm.

The new control system not only directs positioning of the work table and three-axis spindle; it also controls tool selection, tool changing, spindle speed, feed rate, and auxiliary functions such as turning coolant on and off and shuttle work pallet between index table and load and unload stations.

Slope and arc cutting can also be performed by the machine. This feature does not introduce control complexity, nor difficult tape preparation problems requiring computers.

The machine will perform circular cutting of radii from 0.1 to 9.9 inches in radius increments of 0.1 inch. The maximum error on arc milling is plus or minus two percent of arc length. Maximum speed for arc and slope cutting is 30 ipm for radii between 0.5 and



**Rotary tool magazine** loaded with 30 all different cutting tools . . . from shell end mills to boring tools to taps, each chucked in a coded holder. The tool change arm is shown here in parked position. The tool selection reader head can be seen at the left next to the shell end mill.



9.9 inches. According to design engineers the control permits users to mill clearances, "walk" around joint faces, and perform similar jobs where high accuracy is not required.

First step in processing a part for the machine consists of listing dimensions, machining sequences and auxiliary functions on a simplified planning sheet. To do this, the engineer or technician takes the necessary information from an ordinary blueprint. Then a typist, using a standard typewriter-tape punch, transcribes the planning sheet data. To provide a visual check of the accuracy of the transcription, corresponding numbers are typed onto the planning sheet at the same time they are being punched into the one-inch, eight-channel input tape.

After checking the typed numbers against those originally placed on the

planning sheet, the tape is ready for use. If corrections are necessary, tapes can be readily duplicated with only the changed data requiring attention.

At the machine, tape is read by a standard mechanical tape reader. The control system is equipped with dual storage registers to eliminate any loss of machine time while tape is being read.

A push of a button is all that is required to put the versatile combination machine into operation. Once started, it will continue to function automatically until the programmed job is completed. While the machine is in operation, the operator is free to prepare the next workpiece for production and to select the necessary tools required if a new part is to be machined. This makes possible a complete change-over in minimum time.

• • •

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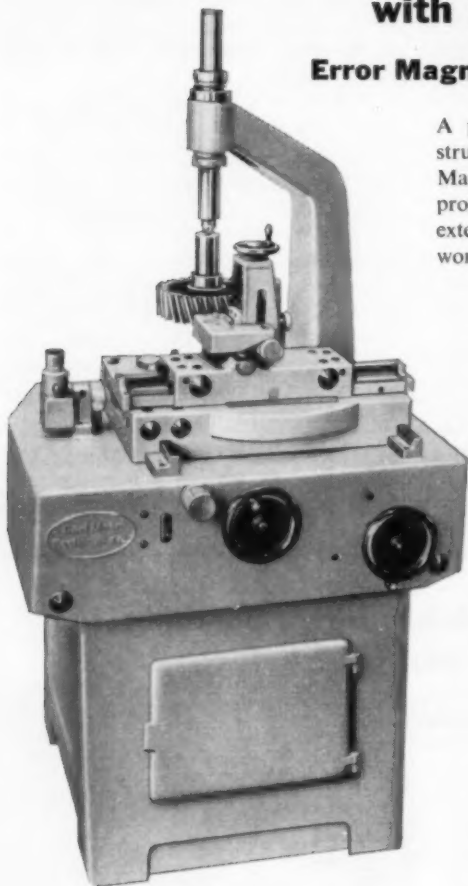
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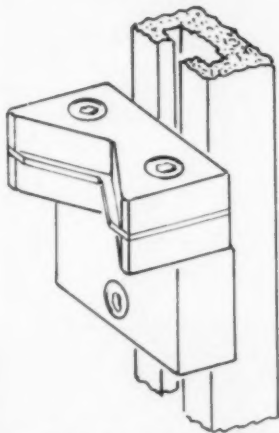
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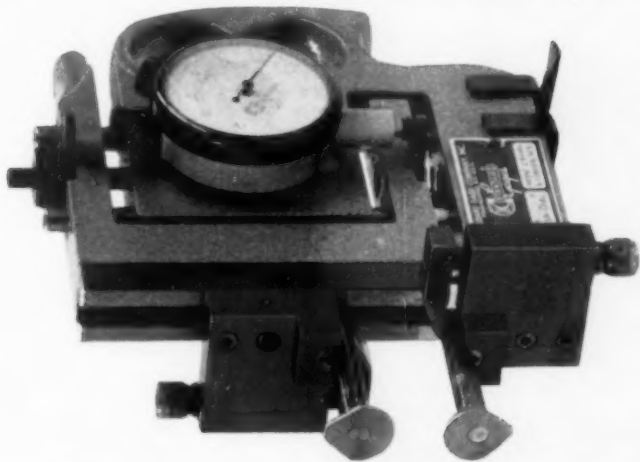
### How Pitney-Bowes Cuts Gaging Costs

STAMFORD, CONN.—Impressive savings in gage inventory and gage design time have resulted at Pitney-Bowes, Inc., makers of postage meters and business machines, from the use of a basic indicating gage unit to which can be attached various anvils and jaws to suit differing sizes and shapes of parts to be measured. Called Versa-Dial, this unit is a product of Standard Gage Co., Inc., Poughkeepsie, N.Y.

The entire general practice at PB was changed, starting three years ago, from using many gages, each good for only a single dimension, to that of using a relatively small number of these versatile units. In addition to cutting gage inventory the present sys-



**1. Anvil** for checking longitudinal spacing of grooves.



**2. Rods with contacts** which can be clamped on anvils.

## Field Reports

continued

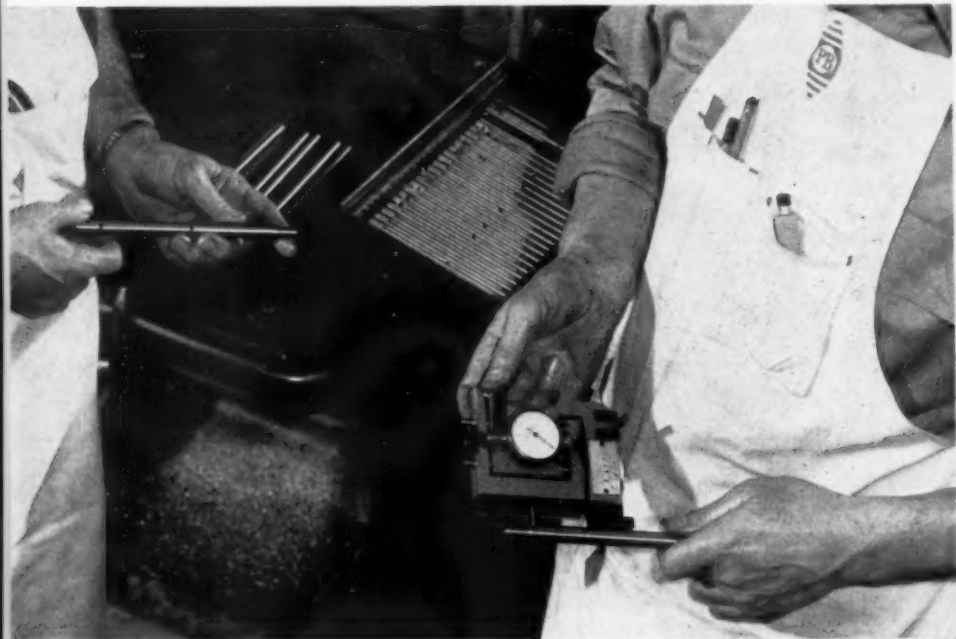
tem affords quantitative measurements against only the go or no-go answers of the limit gages previously used. Versa-Dials are easily set up for parts as they are started in production.

In practice, 20 of these dial units and a variety of anvils take the place of what under the previous system would be 200 special, single-dimension gages. At PB the attaching anvils are made versatile as well as the indicating unit through a study of their various requirements and designs of anvils which permit adjustment.

Parts gaged include shafts with narrow annular grooves—the separation

between grooves being important; rods with critical dimension from the center of a cross hole to a shoulder, and gears with a specified concentricity of pitch diameter and center hole. Most of the inspection is carried out while the parts are in process throughout the plant, thereby disclosing any out-of-tolerance conditions before they entail much scrap. (See illustration).

By far the most common type of measurement is that of the shafts with longitudinal spacing of the grooves specified to a total tolerance of .003" on the average. There are about 100 such dimensions differing from each



**Test-checking** cross hole locations in shafts.

other as to shaft diameter, groove spacing, or both. PB has covered all of these with only three pairs of anvils which have vees to locate on the rod and leaves protruding within the vees to enter the groove. (See Fig. 1) Each pair of anvils covers a range of rod diameters and their range as a group is from .040" to 1 3/8".

The gage is set by inserting gage blocks between the vees or even by miking over the vees, proper allowance being made for the thickness of the vees and of the leaf, if necessary. The thickness of the vees is made to the same dimension within .0001" tolerance for all three pairs of anvils to permit and facilitate this method of setting.

Another type of measurement is that between a cross hole in a rod and a shoulder. For such gaging the unit is set up with one of the anvils described above, the other anvil carrying a pin to go in the cross hole.

Pitch radius of gears is measured by using specially designed anvils one of which carries vees for the accurate location of the gear shaft while still permitting its rotation. The other anvil carries a precision wire for contacting between teeth. Thus the gear can be merely rotated and checked at different points for being within the .002" tolerance.

PB's reports having set up Versa-Dials in short order for jobs which have arisen unexpectedly and which formerly would have involved delays of several days at best. An example of the versatility obtained by PB is the pair of anvils shown on the Versa-Dial in Fig. 2. These are for checking internal or external undercuts and take any of various rods fitted with special contacts on their ends.

• • •



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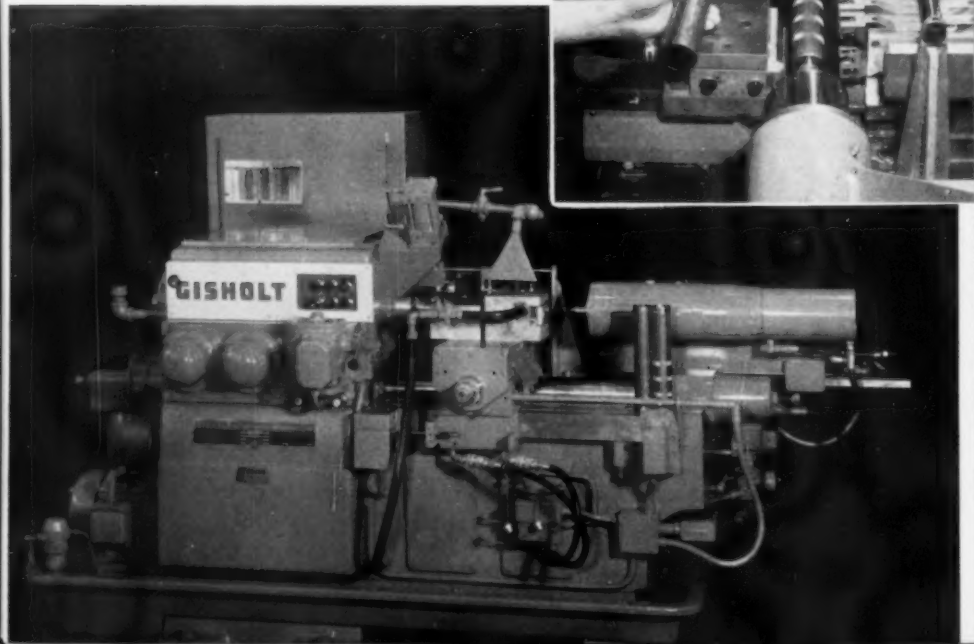
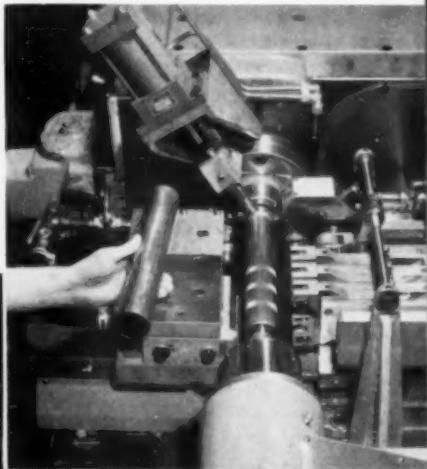
### Grease Gun Barrel Production Upped 200%

Omaha Steel Works of Omaha, Nebraska, is machining grease gun barrels 200% faster than by former methods on a test run of 1000 pieces.

A Gisholt Masterline No. 12 Automatic Chucking Lathe is furnished with a standard cross feeding front carriage, a rear independent slide and an air operated tailstock mounted on a separate independent slide. The work is positioned longitudinally against a

special, headstock mounted air operated, retracting locator. It is held and driven by an expanding mandrel mounted on the spindle, expanded and supported at the other end by the tailstock. Tooling is designed to permit machining grease gun barrels that can be used with 3 different manufacturers equipment with no further

**Simple setup** upped production of grease gun barrels 200%. In 21 seconds floor to floor time, end of part nearest spindle is turned and thread-rolled, a trademark is rolled on the barrel O.D., 3 separate areas are knurled and the opposite end is "rolled-over" by a special spin-forming roller on standard No. 12 front carriage.



modifications required to permit interchangeability.

Made from welded steel tubing, the parts arrive at the No. 12, after being cut to length with welding flash removed and deburring completed in a previous operation.

To start the operation, the operator slips the 12½" long, 2¼" diameter tube on the arbor, against the locator. He then strikes a push button causing the tailstock slide to traverse 12" forward and the quill to advance 4" to engage the center in the end of the arbor. Pressure from the tailstock center expands the mandrel gripping the work. At this point the locator swings clear of the work and the actual machining cycle starts.

The front slide feeds toward center to the depth of the cut and then longitudinally turning the end for threading. As the turning cut is completed,

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a special form roller engages the opposite end, spin-turning a radius (see part drawing).

Following this, the rear independent slide feeds in to roll the thread on the spindle end, knurl in three areas and roll the trademark on the tube. On contact with the work, the name marking roller makes only one revolution and is then cammed back into the holder while the slide maintains its "in" position until the completion

of the thread rolling and knurling operations.

Lastly, the spindle stops, the front and rear independent slides traverse out and back to their starting positions. A spring repositions the name marking roll for the next part. The tailstock quill and supporting slide reverse traverse to starting position providing ample clearance to permit quick removal of the finished part.

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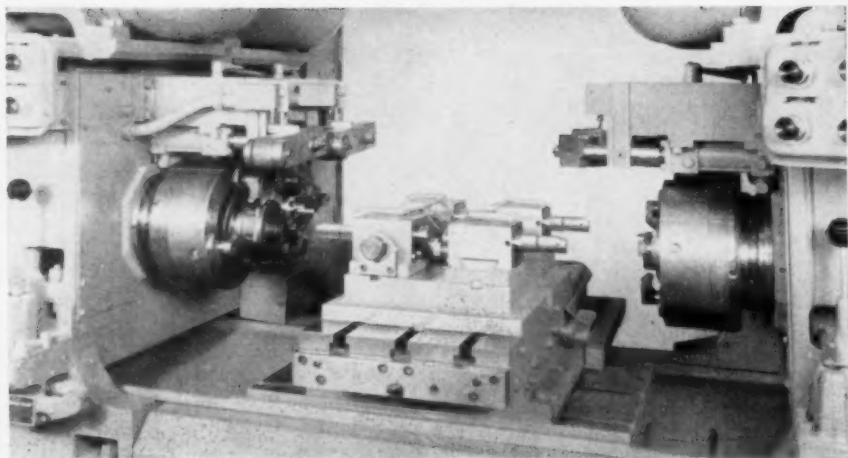
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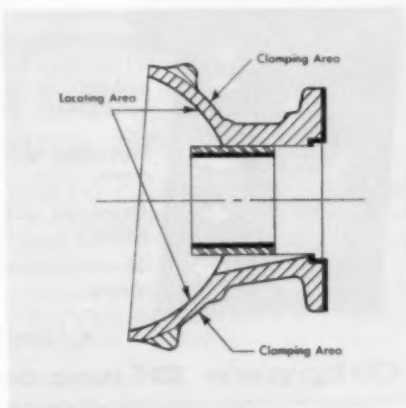
DETROIT—An interesting locating and clamping problem has recently been resolved by Ex-Cell-O Corporation, on one of their Precision Boring Machines.

The component was an automobile universal joint ball and bushing assembly. The operation was to finish bore the bushing diameter and finish face and counterbore the body. It was required to locate from the inner spherical area and clamp on the outer spherical area. Radial location was from an internal slot in the part.

A special air operated chuck was designed and used in conjunction with a ram to fixture the part. After radial location by hand, the ram squared and held the part, clamping was then effected and the ram withdrawn.

The machine, equipped with two standard Ex-Cell-O Precision Spindles at each end, permits machining at one end while loading and unloading at

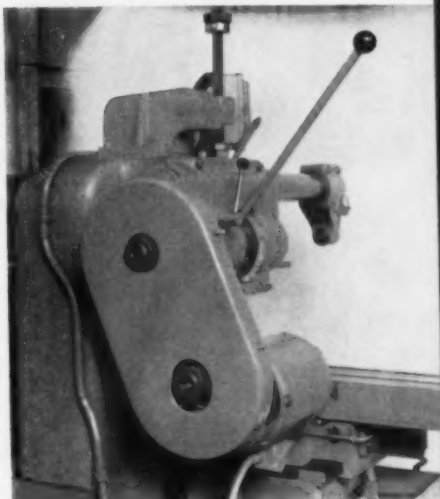
the other. Holding close limits on diameters and concentricity, production is 180 parts per hour. • • •



**Sectional view of workpiece shows spherical locating and clamping areas. Heavy lines denote machining operations.**

### Belt Guard Is Made of Glass Reinforced Plastic

BRIDGEPORT, CONN.—The Product Machine Company is using a glass reinforced plastic belt guard on their new No. 1 bed type miller. The pulley guard was re-designed and manufactured by Repco Incorporated, Worcester, Mass. The guard is made in two pieces and attached with a piano type hinge adhered to the guard with epoxy adhesive. This offers strength and eliminates drilling and tapping. Two clasps quickly open the guard to change the belts. . . .



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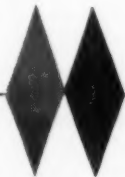
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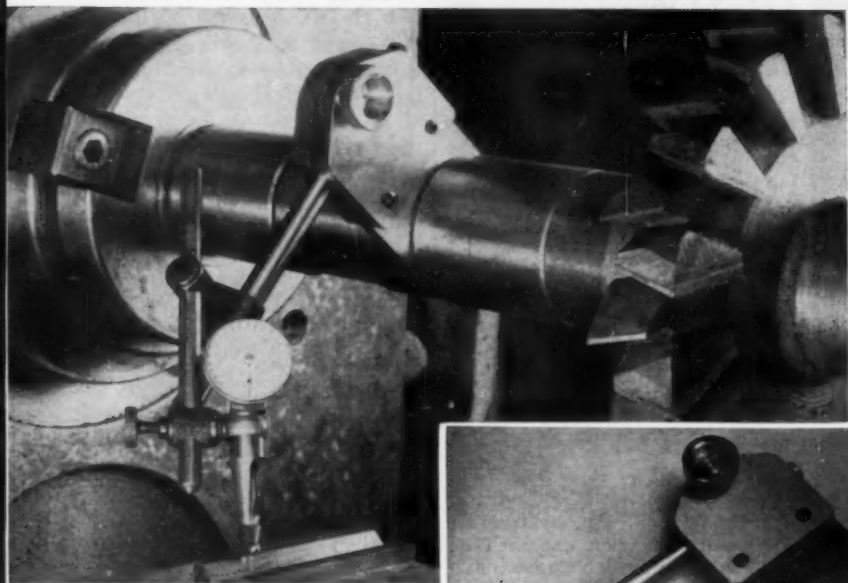
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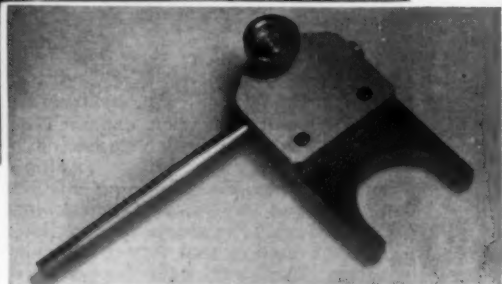


### Indicator Holder for Milling Machine

By H. J. Gerber

● Attachment of a dial indicator to the arbor of a horizontal milling machine has been accomplished by various methods, some of them rather cumbersome and lacking in rigidity. We have made up a simple holder which is not only easy to set up for use but is very rigid and easily positioned for most effective use.

The basis of this design is a rather



thin blade which can be inserted between any two of the collars on the arbor and locked in place simply by tightening the arbor nut.

As may be seen in the illustration, the holder consists of the tool steel blade inserted and set screwed into a thicker body which is in turn provided with a slotted hole into which a short length of drill rod may be inserted. This drill rod may be ex-



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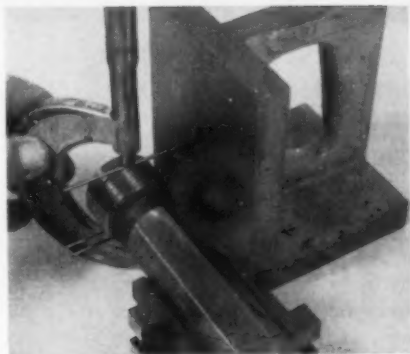
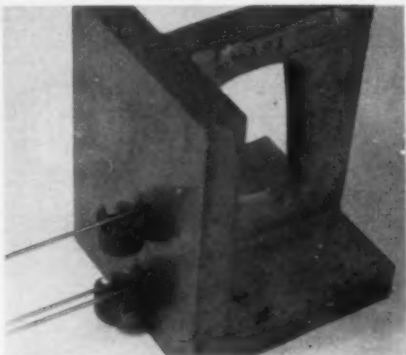
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## Shop Hints

*continued*

tended to desired length and locked with a knurled thumb screw. The dial indicator is attached to the drill rod by means of the usual swivel clamp so often used to hold indicators to a surface gage. • • •

### Small Magnets Hold Thread Measuring Wires



By H. J. Gerber

● Holding thread wires in position when measuring pitch diameter of a screw thread is usually an aggravating problem. A pair of small "button"

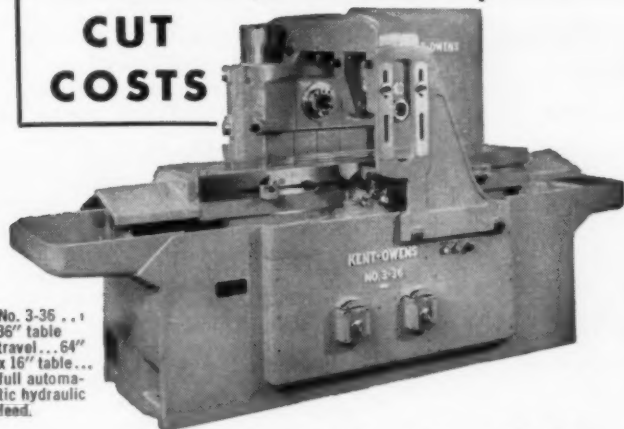


magnets, used as illustrated, will greatly aid in this task. It will be necessary to flat grind a small area on the side surface of each magnet and parallel to the slot opening between the poles of the magnet.

To make this set-up I find it convenient to make use of a small angle plate as a support for the magnets. An ordinary "V" block or small tool-maker's vise will usually provide a good means of holding the work. Each

magnet is seated on the angle plate with contact being made by means of the above mentioned flat on the side of the magnet. The wires are then laid across the poles of the magnets, one on the top magnet and two on the lower one. The work is then positioned between the wires and magnets moved on the plate until the wires are seated correctly in the thread groove. Both hands are now free to manipulate the micrometer. • • •

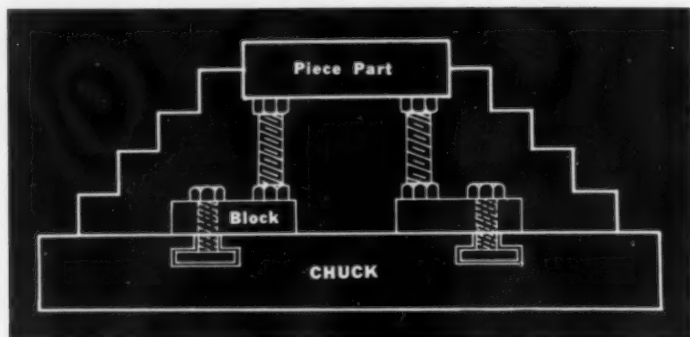
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### Parallel Facing Made Easy

By John M. Breen

● At times in almost every machine shop there arises a job where a quantity of pieces need be faced off perfectly parallel. Here is a system where it can be performed very simply and inexpensively.

Many lathe chucks have slots spaced between the jaws. This can be used for fastening the backups. There are four in all as we are working on the principle of four chuck jaws. Each backup consists of a block and two bolts. One bolt fastens it to the chuck.

The other bolt is raised to the desired height, then locked with a nut as are the other three. With the four heights equal the facing cut is taken. Since bolt head facing utilizes very little cross slide travel, facing time is very short. We then have four perfectly parallel points to backup the work piece.

The work piece is then clamped in the chuck. Slight taps of a hammer will seat it against the backup. We can now face our piece part and be sure of perfect parallelism. These backups can be kept with the lathe tools and used for many jobs of this same nature.

• • •



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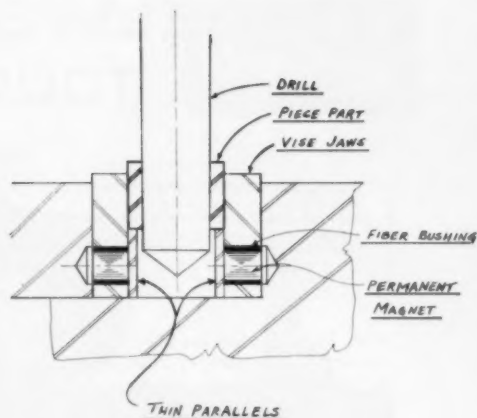
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## Preventing Drill Damage With Thin Parallels

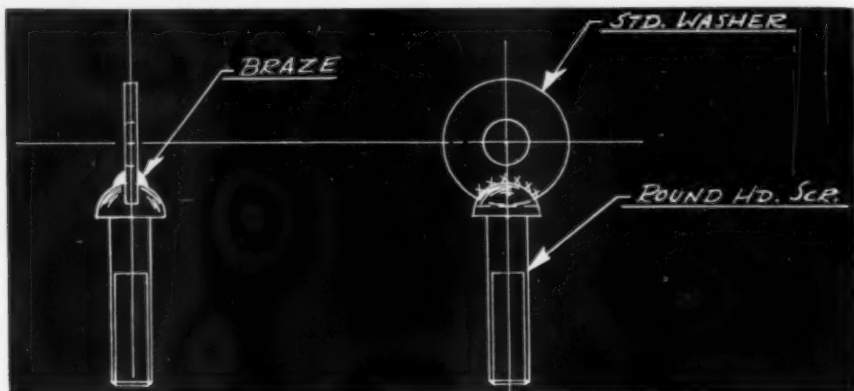
By F. A. Adams

● Many tool shops suffer a great amount of drill and piece part damage when it becomes necessary to use thin parallels for drilling thin walled parts. Quite frequently, the thin parallels topple over, the result being tool or piece part damage.

A very effective solution to this problem is shown in the accompanying sketch. The vise jaws are drilled and reamed to receive press fitted fiber bushings. Permanent magnets are then pressed into the fiber bushings as shown. These magnets hold the thin parallels tightly against the holding surfaces of the vise jaws thus prevent-



ing any toppling action which may sometimes occur. Chips clinging to the magnetized parallels are easily wiped off with an old paint brush. ● ● ●



## Thumb Screws at a Minimum Cost

By R. K. Dulek

● Many ingenious ideas originate on the toolmaker's bench. These small, time and money saving ideas are priceless in the cost conscious tooling programs of today.

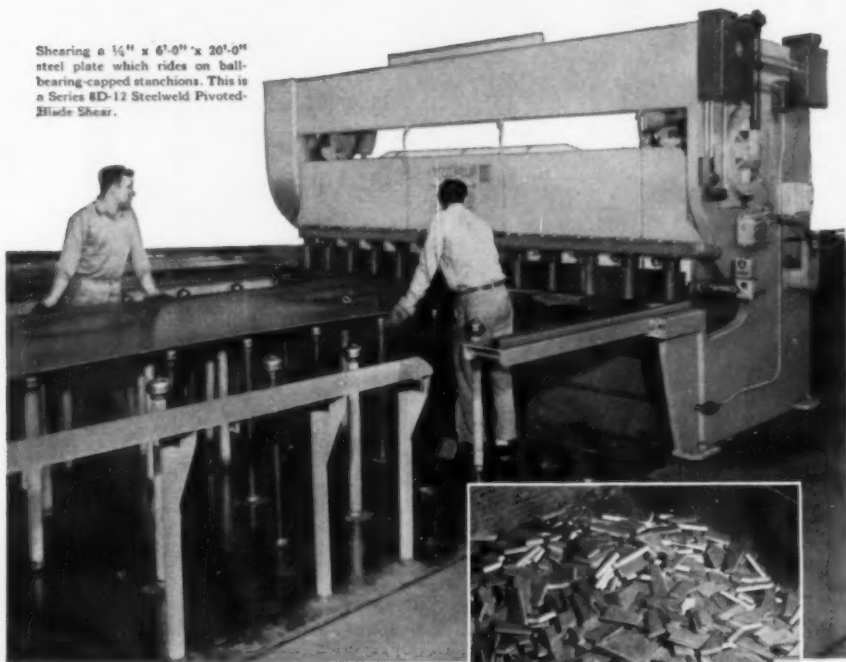
Shown in the accompanying sketch

is one of these ideas. A thumb screw, made from a standard screw and a standard washer. A round or button head screw with a standard plain washer, brazed in the head slot, provides a perfect and inexpensive thumb screw for jigs, fixtures, etc. ● ● ●

# STEELWELD SHEAR

## Serves TOUGH JOBS Well

Shearing a  $\frac{1}{4}$ " x 6'-0" x 20'-0" steel plate which rides on ball-bearing-capped stanchions. This is a Series 8D-12 Steelweld Pivoted-Blade Shear.



A part of an order of 120,000 gussets cut on the shear.

FOR several years a Steelweld Shear has been in operation at the Drake Steel Supply Co., Los Angeles, California. Most of the time it has been worked on a 16-hour-a-day schedule. It is used for a wide variety of shearing, mostly on  $\frac{3}{16}$ -inch and  $\frac{1}{2}$ -inch steel plate.

The machine has proven itself on all sorts of shearing jobs. A particularly tough one was the cutting of 120,000 small odd-shaped gusset plates. These were of three sizes and cut three to six at a time of  $\frac{1}{4}$ -inch steel. The work jarred the shear terrifically, but because of its heavy construc-

tion, did not affect it in any way.

Considering the volume of work and hard service, the knives hold up very well. They need be turned only about once every six months.

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**STEELWELD**  
Mechanical and Hydraulic  
**SHEARS** PIVOTED  
BLADE

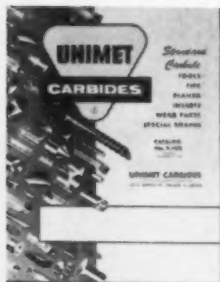


Steelweld Machinery includes: Mechanical & Hydraulic Shears and Presses, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

**THE CLEVELAND CRANE & ENGINEERING CO.**

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(See Number 1)



(See Number 2)



(See Number 3)

To receive copies of booklets described below, circle their identifying numbers on an Action Card, found opposite pages 72 and 168.

**1. Carbides.** Catalog No. A-102 presents carbide tools, tips, inserts, and blanks. Complete performance data on regular and premium grades is included, as well as information on special shapes and wear parts. Unimet Carbides, 435 W. Ontario St., Chicago 10, Ill.

**2. Precision Jig Borer, Model No. 3,** is capable of locating and boring holes to less than a tenth. Brochure shows the greatest possible error of positioning in longitudinal travel in any inch is 30 millionths (in 18", 90 millionths), and in cross travel, 30 millionths in any inch (90 millionths in 11"). Moore Special Tool Co., Inc., Bridgeport 7, Conn.

**3. Aluminum Weldor's Training Manual** is designed to train and qualify individuals in welding aluminum by the inert gas process. Material in the 144-page book covers three primary functions essential to aluminum welding: In the first section, essential factors about both tungsten-inert-gas and metal-inert-gas welding techniques are presented; second and third sections offer amply illustrated step-by-step exercises. Technical Publications Dept., Kaiser Aluminum & Chemical Sales, Inc., 919 N. Michigan Ave., Chicago 11, Ill.

**4. Soft Blank Chuck Jaws.** Bulletin contains complete specifications and data on jaws for all makes of chucks, including air chucks, hand or power operated geared scroll chucks, two- and four-jaw independent chucks, and combination chucks. The booklet is arranged to show interchangeability of chuck jaws between different makes and models of chucks. Gahr Machine Co., 19199 St. Clair Ave., Cleveland 19, Ohio.

**5. Way Guards.** Folder illustrates the Can-Pro accordion way guards, designed to assure protection against wear and damage caused by abrasive flying materials. Fabricated from Butapren, a special synthetic rubber whose flexibility and softness permits guards to be compressed in small areas. The material withstands temperature changes from -45° to 220°F without cracking. Guards are made to customer specifications. Can-Pro Corporation, Fond du Lac, Wis.

## Free Literature

continued

**6. Corrosion Prevention.** Bulletin 93XG describes the Metco metallizing systems, a series of techniques which firmly bond properly treated pure metals to a steel base. These metal coatings assure protection against oxidation for many years. Bulletin pictures some typical applications on a broad range of equipment and structures. Metallizing Engineering Co., Inc., 1101 Prospect Ave., Westbury, N.Y.

**7. Pneumatic Comparator Gages.** Catalog No. 8008 presents a new line of air gages for dimensional measurement and a series of automation building-blocks for size-control systems. It covers newly standardized purchasing data on pneumatic plugs, rings, and gaging cartridges. Moore Products Co., H & Lycoming Sts., Philadelphia.

**8. Carbide Tools.** Enlarged lines of Coromant carbide blanks, inserts, tools and tool holders are described in 52-page catalog. Price list accompanies catalog. Sandvik Steel, Inc., Coromant Dept., 1702 Nevins Rd., Fair Lawn, N.J.

**9. Flexible Couplings.** This catalog contains helpful information on various types of couplings. Dimensions, list prices, horsepower ratings are included. Acme Chain Corp., Holyoke, Mass.

**10. Block-Type Boring Tools** with throw-away carbide inserts are described in Bulletin DB-410-A. The new blocks are designed for use with standard Davis boring bars. Two-cutter blocks are for rough boring and single-cutter, micrometer-adjustable blocks for semifinish and finish boring. Davis Boring Tool Div., Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

**11. Drilling, Tapping, Boring Machine.** Bulletin announces the Burgmaster GE tape controlled six and eight spindle turret drilling, tapping and boring machine. It tells how to program a part, prepare the tape and operate the machine. Cost reducing features work equally well on short run jobs or high production, the manufacturer reports. Burg Tool Mfg. Co., Inc., 15001 S. Figueroa St., Gardena, Calif.

**12. Steel Collets.** Round, hexagon and square steel collets for Jacobs spindle nose chucks are presented in Bulletin JC. A steel emergency collet has soft face and pilot hole to permit rapid boring and stepping out when in place in the chuck. Hardinge Bros., Inc., Elmira, N.Y.

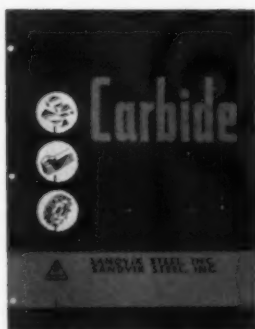
**13. Engine Gap Lathes** feature gap bed, all geared headstock (except one model), a wide range of feeds and speeds, and hardened and ground gears from chrome-nickel-molybdenum steel. Flyer illustrates six models, gives specifications for seven. Hermes Machine Tool Co., Inc., 48-15 Northern Blvd., Long Island City 1, N.Y.



(See Number 6)



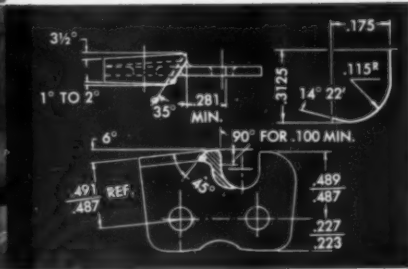
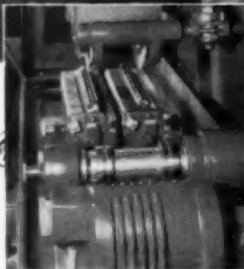
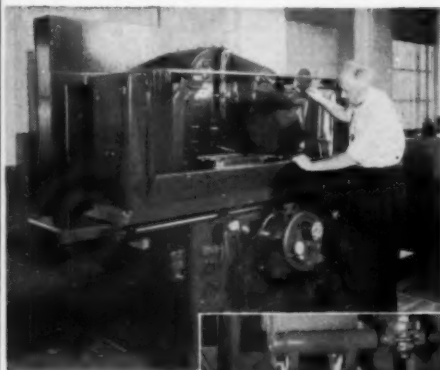
(See Number 7)



(See Number 8)

# Thompson

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Following this policy, its subsidiary, BlueJet Corporation, manufacturers of the famous BlueJet saw chain, installed a Thompson Truforming grinder to grind the cutting edges on their chain saw routers. These routers were formerly ground, piece by piece, by a force of 8 employees.

The Thompson Truforming operation is now cutting former grinding costs by 60%. 3 men only are now required for the operation. 40 L.H. and 40 R.H. routers are now ground simultaneously

with one pass of the crush formed wheel, resulting in a day's production of over 12,000 pieces—many times that produced by the former method. Both the uniformity and sharpness of the routers have been greatly improved.

For 25 years, Thompson has pioneered and developed the modern advances in crush form grinding. If you have a time-saving, product-improving or cost-cutting problem in your operations, it will pay you to investigate the work Thompson Truforming grinders are now doing in plants all over the country. Our engineering experience is available to you without obligation. Write for Catalog T558.

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**THE THOMPSON  
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## Free Literature

continued

**14. O.B.I. Presses,** Minster Series 1, capacities from 35 to 75 tons, are described and illustrated in four-page bulletin. They are equipped with combination air friction clutch and brake unit. New features include a modified flanged slide that provides more die area and a time-saving lower connection ball box connection adjustment. The Minster Machine Co., Minster, Ohio.

**15. Grinding Wheels.** Catalog No. 7525 includes vitrified, resinoid and rubber bonds in cut-off, straight, recessed and plate-mounted wheels. Recommended applications are given. Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

**16. Diaphragm Chuck.** Illustrated with photographs, sectional views and dimensional drawings, folder gives detailed information and full specification data on the three basic models comprising the line. Erickson Tool Co., Solon, Ohio.

**17. Diamond Tools,** for general and special applications, are presented in 20-page catalog. Single point diamond dressers, hardness testing diamonds, boring and turning tools, gear grinding dressers are among products included. A. Landau Co., 247 S. Ninth St., Philadelphia 7.

**18. Bearing Lubrication.** Lubrication of miniature instrument bearings is the subject of lubrication manual claimed to be the first of its kind in the miniature bearing industry. It supplies data and information of the various types and brands of oils and greases available to bearing designers and users. Miniature Precision Bearings, Inc., Precision Pk., Keene, N.H.

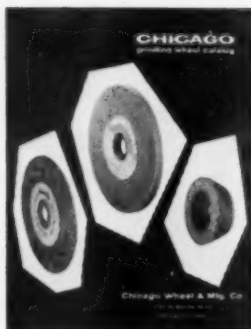
**19. Machining Aluminum.** A handy size, ready-reference handbook provides complete data on machining practices, tool angles and designs, and tool materials. Proper speeds, feeds, lubricants and cutting compounds are explained fully, enabling machinists and engineers to realize the speed and ease possible in machining aluminum and its alloys. Reynolds Metals Co., Dept. PRD-3, Box 2346, Richmond, Va.

**20. Variable-Speed Pulleys.** Bulletin No. 4101 describes pulleys designed to eliminate freezing and sticking. Gives technical data for five MS sheaves for ratings of 2, 3, 5, 10, and 15 hp. Pulleys have no keys to obstruct the flow of oil between the flange hub and sleeve. T. B. Wood's Sons Co., Chambersburg, Pa.

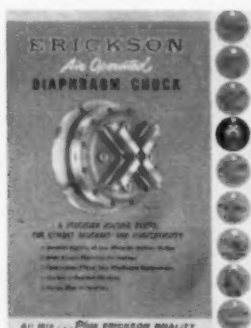
**21. Disc Grinding.** Bulletin gives vital data on important time savings now possible in disc grinding. New DH4 double horizontal spindle disc grinder is claimed to make disc grinding virtually automatic. Features: push-button operation, accuracy to tenths, 3-step abrasive change, automatic dressing and sizing. Besly-Welles Corp., South Beloit, Ill.



(See Number 14)



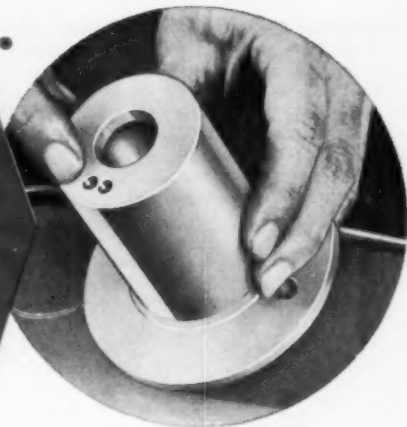
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(See Number 16)

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Use the **Lift Swing Drilling Fixture** with a double top plate and drill two holes side by side with a minimum of wall thickness in between . . . this is accomplished without "special" drill jig bushings and without difficult-to-grind flats on bushings . . . just drill using one side of the double plate, swing 180° and drill using the other side—fast and simple.

You can drill and ream or you can drill two different diameter holes at the same location; yes, two operations without bushing changes. Lift Swing with a double top plate . . . provides Faster, Easier Tooling; Reduced Tooling Costs; Less Down Time; Increased Production.

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ASA Standard Drill Bushings • Precision Parts • Lift-Swing Drilling Fixtures

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## Free Literature

continued

**22. Flotation System.** Brochure describes flotation units employed in metal working operations. By achieving continuous, fully automatic clarification of water soluble oil coolants, the units increase productivity of machine tools, end down time due to failure of coolant supply and the need for sump cleaning. U. S. Hoffman Machinery Corp., Thompson Rd. Plant No. 1, Syracuse, N.Y.

**23. Indicator Holders, Magnets.** Erick Magna holders, as described in Catalog No. 958, are lifetime, magnetized holding devices and like an extra hand help produce more accurate work. The various holders are illustrated with features and specs. A magnetic base protractor is described as a combination angle finder, center locator and leveling gage. Vise liners, magnetic blocks, and magnets are also covered. Cullen Manufacturing Co., Racine, Wis.

**24. Granite Surface Plates,** from small toolmakers' flats to large 7' x 14' models, are described in illustrated brochure. Straight edges, surface plate stands, parallels and angle plates are also included. Surface plates are lapped to an over-all accuracy as close as 25 millionths of an inch. Pratt & Whitney Co., Inc., West Hartford 1, Conn.

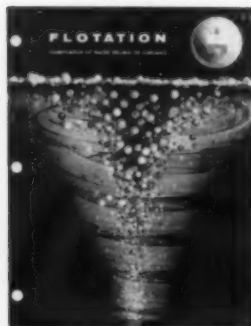
**25. Semi-Automatic Lathe (MR-6020)** is built for applications in the fields of electro-mechanics, instrument manufacture, ordnance, optics, and fine mechanics in general. Brochure gives a chart on machining time per component in seconds and main technical characteristics. One operator can attend two machine heads at the same time. Carl Hirschmann Co., Inc. 30 Park Ave., Manhasset, N.Y.

**26. Barrel Finishing Equipment.** Fourteen standard units, two small barrel models and 11 specialized barrel finishing machines are described in booklet. Free sample processing of parts in test laboratories. Almco, Queen Products Div., King Seeley Corp., Albert Lea, Minn.

**27. Cold Chambers** (shotwells, shotsleeves, bushings, plunger tips) are described in flyer. Customer heat treat requirements, material demands and size tolerances are followed exactly, the manufacturer claims. Advance Products Corp., North Shore Drive, Benton Harbor, Mich.

**28. Drilling Tool.** Folder presents the Roto-Bor, claimed to be the only tool that successfully drills holes in both light and heavy gauge sheet metal and plate, stainless steel, brass, aluminum, plastics, fibers, cork, rubber, even honeycomb and paper. Tool features disappearing center point. Holes are accurate to .001". Jancy Eng. Co., Davenport, Iowa.

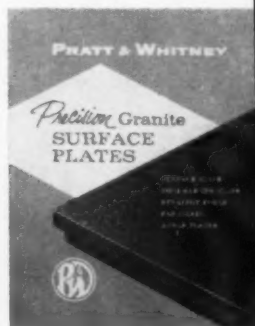
**29. Packaged Water Chillers.** Catalog No. 515 includes complete description, performance data, specifications and dimensions of the Acme Model RG packaged



(See Number 22)

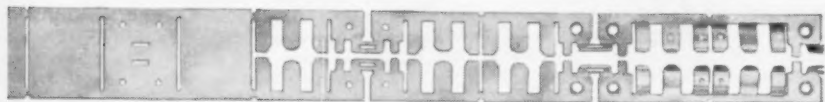


(See Number 23)



(See Number 24)

**MANUFACTURER:**  
Harvey Hubbell, Inc., Bridgeport, Connecticut.  
**PRODUCT:**  
Contact Spring.  
**PRODUCTION:**  
136 Parts Per Minute.



**Blanking, Piercing and Preforming in Press**



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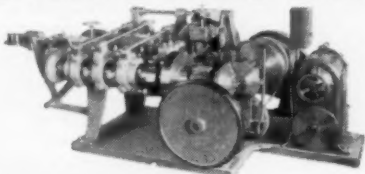


**Partial Forming with Slides**



**Final Forming with Slides**

**Nilson 4-Slide Machine  
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## **NILSON 4-SLIDE BLANKS *and* FORMS IN ONE CYCLE!**

Harvey Hubbell shifted production of this part from a conventional press and progressive dies to a Nilson 4-Slide with built-in press. The immediate results: elimination of two secondary operations... simpler die... higher production rate... no stripping problems.

Harvey Hubbell also found that vertical mounting of die makes replacement easy... permits automatic disposal of scrap by gravity. And maintenance costs are incred-

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Nilson builds 7 models of ribbon metal forming machines, with built-in press sections ranging from 5 to 75 tons capacity. One of these machines may help you bring your stamping methods up-to-date!

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General Catalog on Auto-  
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**AUTOMATIC WIRE & RIBBON METAL FORMING 4-SLIDE MACHINES • WIRE & STOCK REELS • WIRE  
STRAIGHTENING EQUIPMENT • AUTOMATIC STAPLE FORMING MACHINES • SPECIAL WIRE FORMING EQUIPMENT**

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## Free Literature

continued

water chillers. This unit has been reduced in size from previous models. Capacity range, 3-30 tons. Acme Industries, Inc., Jackson, Mich.

**30. Selenium Rectifiers.** for efficient, economical AC to DC rectification, are catalogued in 10-page booklet. Cell sizes range from 1" square to 12" x 16". Four pages contain continuous DC current ratings for 26, 33, 36, 40, 45, and 52 volt RMS cells. Syntrol Co., 300 Lexington Ave., Homer City, Pa.

**31. Milling Machines.** The Newton line of special production-line milling machines is discussed in Bulletin 675-A. Types included are straight-line, vertical openside, sliding head, shuttle type, rise and fall, rotary index, traverse, planer and traveling column. Consolidated Machine Tool Div., Farrel-Birmingham Co., Inc., Rochester 10, N.Y.

**32. Bed Type Milling Machine.** The Producto No. 1 is sturdily constructed for accurate, rapid milling of light and medium production work. The machine is available in three standard arrangements, with hydraulic or manual feed, and work surfaces of different dimensions for varied amounts and kinds of work. Booklet from the Producto Machine Co., 990 Housatonic Ave., Bridgeport 1, Conn.

**33. High Temperature Steels and Alloys** data card, 3 3/4" x 5 1/2", lists 19 special metals used in high temperature applications, such as parts for jet engines, gas turbines, missiles. Composition of each alloy, its base material, density, rupture strength data at various temperatures, and its short time properties at room temperature and at 1200°F are included. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

**34. Precision Tools.** Bulletin M81 describes convertible thimble micrometers with a range from 0 to 1" by .0001"; height gages with new versatility and stability; a Super Hite Chek, self-contained transistorized unit that reads in 25 millionths; tool setting gages; edge finders; radius gages; sine plates; dial snap and bore gages. Brown & Sharpe Mfg. Co., Providence.

**35. Master Multi-Swivel Vises, Platens,** swivel platens, swivel bases, flanged vises, swivel vises are presented in folder. Multi-swivel platen holds large or irregular-shaped parts and dies that cannot be held in jaws of vise. Multi-swivel base is recommended for use where it is necessary to have a fixture that will swivel up to 90° vertically and 360° horizontally. Donovan Mfg. Co., 80 Batterymarch St., Boston, Mass.

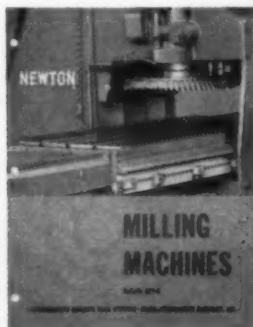
**36. Hydraulic Panel Fabrication Technique,** described in 8-page brochure, utilizes building block standard component subplates with pressure, return and drain lines manifolded within the block. Parts are reusable for future circuit modifications. Petch Mfg. Co., Detroit.



(See Number 29)



(See Number 30)



(See Number 31)



What-collet do you need?

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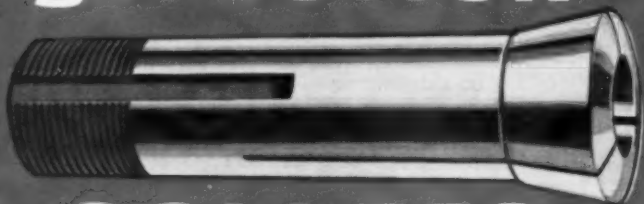
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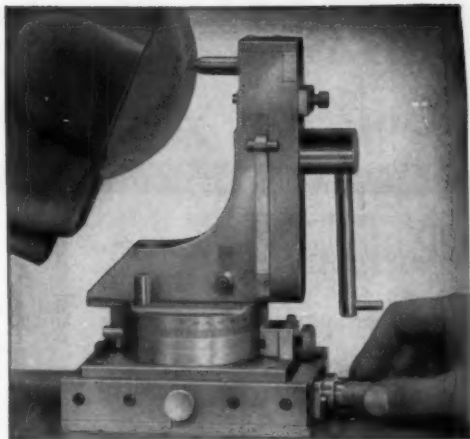
# Tough Grinding Wheel Forms Dressed Easy as A, B, C

eliminate elaborate set-ups  
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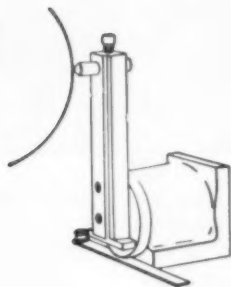
.0001" ACCURACY

## *Fluidmotion* WHEEL DRESSERS

dress two angles tangent to a radius  
in one continuous motion



With the unique "Fluidmotion" Dresser, you can dress two angles tangent to a radius — using one handle in one continuous motion. Operation is so fast and simple that beginners can use them.

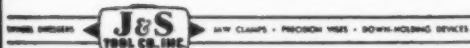


Adaptable to all type cylindrical and surface grinders.

- A. Obtain micrometer reading; add required convex radius or subtract required concave radius.
- B. Loosen jib with wrench and "mike" over lower pins to reading obtained above.
- C. Tighten jib. Set stops for two angles. Ready for action.

Also available: "FORM MASTER" Dresser, capable of dressing any radii up to 12" convex, up to 15" concave.

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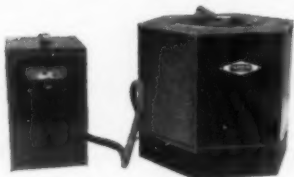
# NEW Electric Furnaces built for your specific needs!

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**TYPE 2100**

**for small parts and short runs**

- Top-loading
- 6-3/4" dia. x 11" deep chamber
- 6-1/2" x 7-1/2" stainless steel pot
- Triple-insulated



This low-cost, multipurpose THERMOLYNE Type 2100 Furnace is adaptable for use as salt bath, melting, vertical muffle or crucible furnace. Basic unit includes furnace, alloy pot and cover with lifting handle, and thermocouple in protection tube. Optional maximum-use accessories include refractory ladle and refractory liner with cover. Three types of insulation hold heat loss to a minimum. Automatic or semi-automatic electronic temperature controls available. 115 or 230 volts. Price of basic unit, without controls, \$180.00.

**TEMCO**

**TYPE 1900**

**for long work parts  
and high temperatures**

There's no waste space in this new TEMCO Type 1900 Furnace with the chamber long in relation to its height and depth. Choice of 2000° or 2300°F maximum operating temperature, 115 or 230 V. Gives fast heating, quick recovery time, and big power reserve for heavy loads. Available with wide selection of control instruments. Price (furnace only) \$215 or \$235, according to temperature range.



- Chamber dimensions: 13-1/4" deep, 4-3/16" high, 4-7/16" wide
- Reinforced, welded steel shell
- Easily operated door

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### Machine Tool Orders, Shipments for January

From the National Machine Tool Builders' Association comes a preliminary report of activity in machine tool sales and shipments during the month of January.

Gross new orders for metal cutting type machine tools totaled \$28,700,000 that month (preliminary figure, domestic and foreign combined). December gross new orders were \$33,100,000.

Cancellations of orders for cutting type machines plunged to \$600,000 in January, down \$1,450,000 from December cancellations, and making net new orders for January \$28,100,000 (domestic \$23,650,000, a drop of \$2,450,000 from December; foreign \$4,450,000, down \$500,000 from December's \$4,950,000 foreign sales).

Shipments of metal cutting type machine tools for January (both domestic and foreign) are estimated at \$23,850,000. This is \$10,050,000 less than December, when shipments reached \$33,900,000. January's estimated backlog (in months) was 3.4.

In the metal forming branch of the industry, net new orders totaled \$12,050,000 for January, down \$800,000 from December. Domestic net new orders for December were \$8,650,000 and foreign \$4,200,000, for a combined total of \$12,850,000.

Forming type shipments for January amounted to \$7,950,000 (\$5,850,000 domestic and \$2,100,000 foreign), \$2,100,000 below December's \$10,050,000 shipments. In January the estimated backlog (in months) was 3.7.

### Cutter Service Company Organized by B & S

A complete cutter and tool sharpening service has been added by the Cutting Tool Div., Brown & Sharpe Mfg. Co., Providence, R.I., with the organization of "The Brown & Sharpe Cutter Service Co. of New Jersey," located at Ridgefield, N.J. This is an independently operated business staffed by factory trained cutting tool specialists.

### Carborundum to Build Pilot Plant

The Carborundum Co. has announced that it will build a new ¾ million dollar pilot plant for its research and development division at Niagara Falls. About one year will be required for the construction of the building, procurement and installation of the equipment.

Carborundum's research and development division is turning out new products which require ultra-high temperature processing techniques not presently available in the main operating divisions of the company. The new R&D pilot plant will provide the special equipment necessary to bring these new products through development stages to a point where they can be allocated to present divisions for production and sale or form the basis for new operating divisions of the company.

The pilot plant will be operated by the new products branch of the research and development division, headed by Donald G. Sturges, manager of the branch.

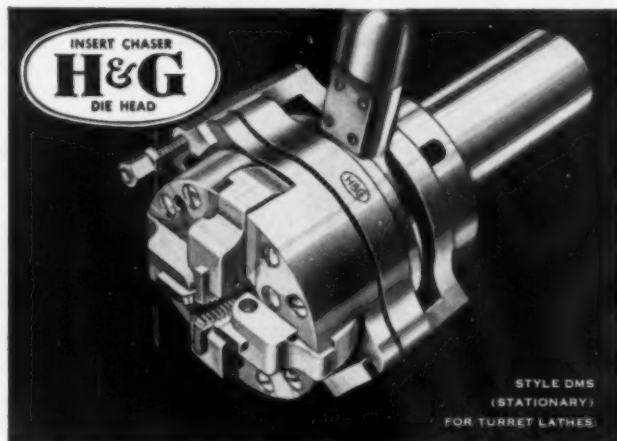
## Brown & Sharpe Buys Howe and Fant

Brown & Sharpe Mfg. Co., Providence, R.I., has announced the purchase of Howe & Fant, Inc., of East Norwalk, Conn., originator and manufacturer of turret drilling and jigless work positioning devices.

Acquisition was by stock purchase. Howe & Fant will become a subsidiary known as the Brown & Sharpe Turret

Drilling Division, Inc. It will continue to operate at the East Norwalk plant with its present personnel.

Distribution of products of the new division will be through Howe & Fant's existing dealers in the metalworking centers of the United States. **Arnold Charlat**, formerly the company's vice-president and chief engineer, becomes president of the new subsidiary, succeeding **A. S. Howe, Jr.**, who will continue as a director.



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

*This die head is unique*

**THERE IS NO OTHER LIKE IT**

It cuts threads with insert chasers. These are, in reality, small sections of the business end of large and expensive chasers, but with this important difference: *their cost is so low they can be even thrown away when dull.* For example, for less than \$50 you can get a dozen sets of insert chasers, each set ground ready to go. Change now to insert chaser die heads and watch your performance improve. "UNIFIED AND AMERICAN SCREW THREAD DIGEST" sent free on request.

THE EASTERN MACHINE SCREW CORP., 25-45 Barclay St., New Haven, Conn.

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*Cut* MACHINING COSTS **7** WAYS

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UNIVERSAL-POSITIONING

## "Throwaway" Carbide TOOL HOLDER



Also hold  
square or round  
tool bits or bor-  
ing bars with  
standard  
clamping  
cap.

Ask your  
mill supply  
house or  
Maxwell  
representative

Counterboring



Heavy Turning



Chamfering  
I. D.



Facing



Chamfering  
O. D.



1. Adjusts to ANY horizontal position—right, straight, left—in a complete circle. Cuts tool holder inventory!

2. Holds carbide insert at any desired angle or use for facing in either direction—to or from center. The ONLY throwaway carbide tool holder for ANY standard lathe tool post!

3. Precision-ground, positive-rake carbide insert can be indexed FOUR times. Extra savings!

4. Adjustable carbide chipbreaker on cap assembly also can be indexed FOUR times. More economy!

5. Fast, convenient clamping speeds indexing or positioning inserts. Saves time!

6. No need to change tool holder for different work positions. Simply rotate clamping cap and adjust insert. Cuts set-up time!

7. Serrated clamping cap, forged shank and anvil and locking cap screw hold carbide inserts in perfect grip—no lateral movement, no chatter. Cuts scrap loss!



AA-9176

## MAXWELL INDUSTRIES, INC.

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H. J. Fredericks



E. J. Shages



H. A. Johnson

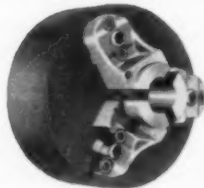
## Appointments and Promotions

### Personnel Changes . . . Executive and Production

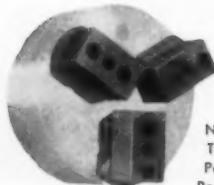
Name	Company	To	Position
Robert H. Kemp	E. W. Bliss Co. Canton, Ohio	L. & J. Press Corp. Elkhart, Indiana	Chief Engineer
Jacob J. Jaeger	Pratt & Whitney Co., Inc. West Hartford, Conn.	Same	Executive Vice-President
Henry J. Fredericks	Pratt & Whitney Co., Inc. West Hartford, Conn.	Same	Vice-President
Edward J. Shages	Pratt & Whitney Co., Inc. West Hartford, Conn.	Same	Vice-President, Mfg.
Roger Marriott	Barnes Drill Co. Rockford, Ill.	Same	Secy.-Treas.
Alfred G. Blisk	Barnes Drill Co. Rockford, Ill.	Has retired from his position as Secretary-Treasurer.	
Harold A. Johnson	Barnes Drill Co. Rockford, Ill.	Same	Vice-Pres., Eng. & Mfg.

## ► BEDFORD GEAR'S "adjustable" CHUCK JAWS ... CUT SOFT-JAW EXPENSE ... REDUCES SET-UP TIME ... ELIMINATES SOFT-JAW BORING ON REPEAT RUNS!

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TOP-JAW  
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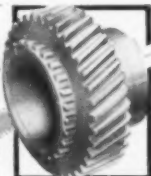
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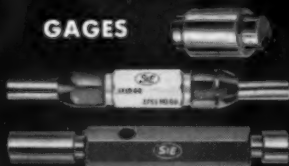
## Personnel Changes . . . Executive and Production

Name	Company	To	Position
Alfred T. Blackburn	Cincinnati Milling Machine Co. Cincinnati, Ohio	Same	Vice-President, Mfg.
Clyde Eby	Cincinnati Milling Machine Co. Cincinnati, Ohio	Same	Works Manager
Franklin Meyer, Jr.	Taft-Peirce Mfg. Co. Woonsocket, R.I.	Same	Mgr., Small Tool & Gage Divs.
Paul V. Miller	Taft-Peirce Mfg. Co. Woonsocket, R.I.	Same	Consulting Engineer
D. F. Griffin	Vanadium-Alloys Steel Co. Latrobe, Pa.	Landis Machine Co. Waynesboro, Pa.	Chief Metallurgist
H. E. Robison	Wheel Truing Tool Co. Detroit, Mich.	Same	President, Treasurer
R. S. Fowler	Wheel Truing Tool Co. Detroit, Mich.	Same	Vice-Chairman of Board
H. B. Wallace	Wheel Truing Tool Co. Detroit, Mich.	Same	Chairman of Board

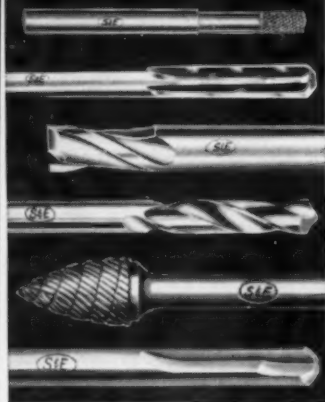
### BUSHINGS



### GAGES



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Tool performance that increases your production and profits—yet costs you less money . . . it's what you want and what you get —when you use S&E TOOLS

That extra quality is no accident. It is the product of more than 20 years experience in the design and manufacture of Tungsten Carbide Tools.

Prove to your own satisfaction that the performance and stamina you need in tooling today—you get in S&E. A fully illustrated catalog of standard and special tools is available upon request.

WRITE:

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Bridgeport, Michigan  
Representatives in all principal cities.







R. E. Reilly



S. E. Bergstrom



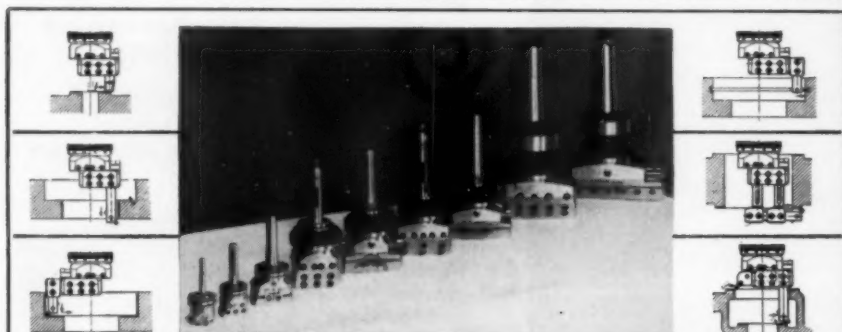
R. C. Bevis



J. F. Kelly

## Personnel Changes . . . Sales and Service

Name	Company	To	Position
Robert E. Reilly	E. W. Bliss Co. Washington, D. C.	Canton, Ohio	Sales Mgr., Spec. Prods. Div.
Leo P. Sinclair, Jr.	E. W. Bliss Co. Baltimore, Md.	Washington, D. C.	Rep., Spec. Prods. Div.
Thomas F. Lynch	E. W. Bliss Co. Canton, Ohio	Same	Midwest Sales Mgr., Special Products Div.
R. E. Bailey	E. W. Bliss Co. West Coast	Los Angeles	Rep., Spec. Prods. Div.
H. L. Cogswell	Barnes Drill Co. Rockford, Ill.	Same	Vice-President, Sales
Swan E. Bergstrom	Cincinnati Milling Machine Co. Cincinnati, Ohio	Cincinnati Milling & Grinding Machines, Inc. Cincinnati, Ohio	President
Robert C. Bevis	Cincinnati Milling Machine Co. Cincinnati, Ohio	Cincinnati Milling & Grinding Machines, Inc. Cincinnati, Ohio	Vice-Pres., Director
James F. Kelly		Madison-Relco Tool Co. Providence, R. I.	Area Sales Mgr.



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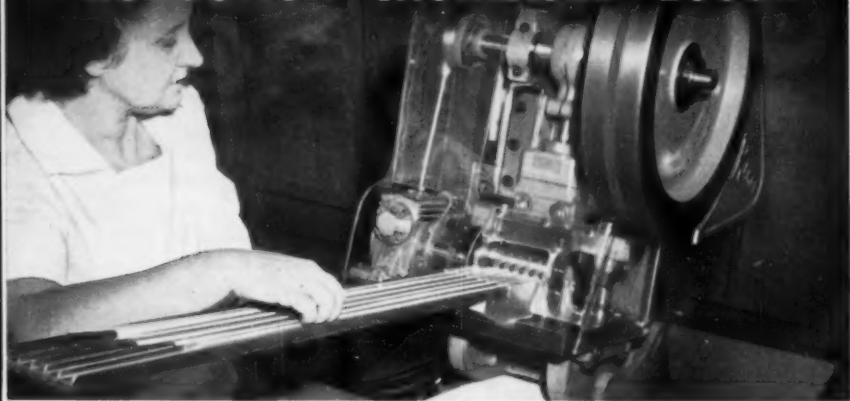
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# PRODUCTION INCREASED 1000%



## ON KENCO SUPER HIGH SPEED PRESS

A leading manufacturer has increased the production of rubber parts from 100,000 parts per shift to 1,000,000 using a 5 Ton Kenco press operating at 500 strokes per minute.

Six rubber strips are roll fed automatically into the dies and the punched parts are dropped out of the die, six at each stroke, and carried away on a power driven belt conveyor. Production is reckoned on the basis of a six hour run per shift.

The cost of producing this item has been substantially reduced because Kenco Engineering enables this press to sustain production at 500 strokes per minute using adjustable automatic feed. The press is equipped with roller bearings which support the crankshaft, connecting rod and flywheel. Automatic lubrication is used with the result that this Kenco press will operate around the clock at high speeds showing no appre-

ciable wear of the moving parts while permitting maximum life of the dies.

Let Kenco Engineers help solve your problems where more profitable punch press operation is your goal. Kenco presses are made in 2, 5, 8, 12, 15, 18, 21 and 26 tons capacities, with 108 Models to select from—the largest selection of small presses available anywhere.

### Job Facts:

**Machine:** 5 ton Kenco Punch Press with high speed roller bearings and automatic lubrication.

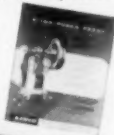
**Feed:** Automatic adjustable roll feed.

**Stock:** Rubber strip.

**Production Advantage:** Increased 10 times at rate of 500 spm compared to production on replaced equipment.

**Maintenance:** None to date:

**WRITE TODAY** for free literature describing the modern mechanical features and complete specifications of Kenco Presses.



also 18, 21 and 26 tons capacities



5211 Telegraph Rd., Los Angeles 22, Calif.

**THE MOST COMPLETE LINE OF SMALL PUNCH PRESSES IN THE WORLD**

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## Personnel Changes . . . Sales and Service

Name	Company	To	Position
Charles Hoppe	Detroit Stamping Co. Detroit, Mich.	Finished Products Div.	Sales Manager
Eric Werner	Adamas Carbide Corp. Kenilworth, N.J.	Tool Specialists, Inc. Westbury, L.I., N.Y.	New Jersey Representative
R. David Mathias	L. & J. Press Corp. Elkhart, Ind.	Same	Vice-President, Sales

## New Dealers and Distributors

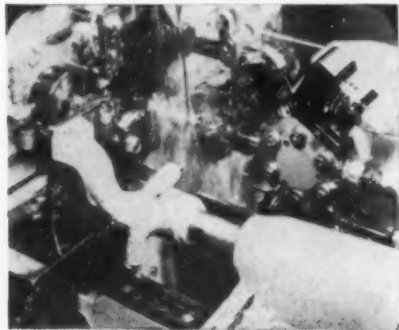
Company	Address	Distributor for
J. W. Mender Chain & Gear Co.	6011 S. Central Ave. Los Angeles, Calif.	Acme Chain Corp. Holyoke, Mass.
Rey Heyne Co.	728 W. Buchanan Phoenix, Ariz.	Size Control Co. Chicago, Ill.
Frank J. Cox Sales Co.	6 Elmview Court Istington, Ontario, Canada	Size Control Co. Chicago, Ill.
D. M. Duncan Machine Co., Ltd.	1958 Wyandotte St., East Windsor, Ontario, Canada	Size Control Co. Chicago, Ill.

## AVAILABLE FILMS

### Screw Machine Tooling

Brown & Sharpe Mfg. Co., Providence, R.I., has produced a new 16 mm color sound film, "Engineered Screw Machine Tooling Applications," which features eight practical applications of the latest design automatic screw machines.

Utilizing close-up views and slow motion, some of the sequences detail the relative position of tooling during close timing operations. Standard and special attachments with explanations of the tool engineering involved in their practical application are featured. Running time is 35 minutes.



Typical parts produced in the filming of "Engineered Screw Machine Tooling Applications"

### Film Acquaints Public with Machine Tools

This movie, designed to tell the story of machine tools to the general public, is not for the purpose of selling machine tools. Its purpose is purely educational. It shows the relationship between machine tools and the standard of living, explaining interchangeability of parts and quantity production, and showing machine tools making the working parts of not only the products which we use for daily comfort and convenience, but of machines upon which we depend for industrial processes. It makes clear that machine tools create jobs instead of destroying them, and it explains how the nation must rely upon machine tools for national defense.

The movie is entitled "One Hoe for Makwanga." Makwanga is a tiny village in the heart of Africa, where crude agricultural implements are still being made by the most primitive methods. In Makwanga it takes a whole day to make a single hoe. The movie opens with actual scenes taken in Makwanga. The contrast between that village and present day America points up the story of machine tools.

The film is available to schools and

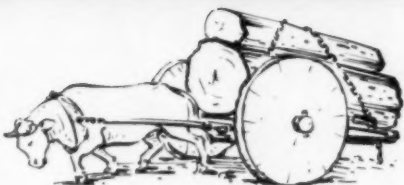


# RUTHMAN GUSHER

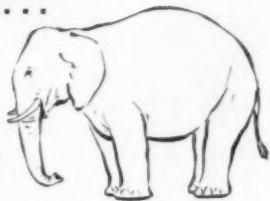
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**Universal Joint Type Drillhead . . .** Full Ball or Bronze Bearing Construction, Standard or Heavy Duty. From 1/2" minimum centers up. Capacities to 1/2" in Steel.



**Single and Double Eccentric Type Adjustable Drillhead . . .** Enclosed, Full Ball Bearing Construction. **New Double Eccentric Type** illustrated.



**Special Fixed Center Drillhead . . .** Made to your requirements. Full Ball Bearing Construction.

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colleges, church and fraternal groups, service clubs, employee meetings, etc.

The planning of the movie has been under the direction of a special NMTBA committee, chairmanned by Rowell A. McCleneghan, adv. mgr. of the Barber-Colman Company. Other members of the committee are: Ross T. Beirne, adv. mgr., Giddings & Lewis Machine Tool Co.; Harry H. Gotberg, vice-pres., engineering, research, Colonial Broach & Machine Co.; James T. Harrington, Secretary, E. W. Bliss Co.; Alphons J. John, manager, employe & community relations, Kearney & Trecker Corp.; Robert D. Lawson, vice pres. & sales mgr., Grinding Machine Div., Norton Co.; Carl J. Linxweiler, advertising & sales promotion manager, the Sheffield Corp.; Frank W. Pensinger, advertising manager, the Monarch Machine Tool Co.; Charles M. Reese, vice pres., Cincinnati Milling and Grinding Machines, Inc.; Chauncey P. Terry, advertising manager, the Hydraulic Press Mfg. Co.

## Development of Twist Drill

A new 16mm 20-minute color sound film, "Pioneers in Precision," highlights the development of the twist drill from the time of its invention by Stephen A. Morse, founder of the Morse Twist Drill & Machine Co., New Bedford, Mass., through the growth of the Morse line and organization to its present position in the cutting tool industry.

## CAM MILLING

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

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MACHINE and TOOL BLUE BOOK

## Boring Head Design

A new color-sound strip film on the design, construction and application of high-precision boring heads has been released by Briney Mfg. Co., 1165 Seba Road, Pontiac, Mich. Boring heads designed around the Briney principle can be adjusted in increments smaller than 1/10,000-inch without loosening or tightening any screws.

The film's running time is 11 minutes. It is suitable for showing to any size technical group interested in new tooling methods and applications. It can also be adapted to training machine operators in the proper use and maintenance of these tools.

## Concept and Principles Of Functional Drafting

A new 20-minute 16 mm. sound motion picture provides a graphic insight into the opportunities to make engineering drawings easier to draft, read and interpret.

The purpose of the film is to explain the basic concepts and fundamental principles of simplified drafting—a technique that is already multiplying engineering output and making dramatic savings in thousands of companies of every size and type.

Further information may be obtained by writing to Gerard A. Glass, executive director, Industrial Education Institute, 25 Huntington Avenue, Boston 16, Mass.

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except Screw Machine Cams

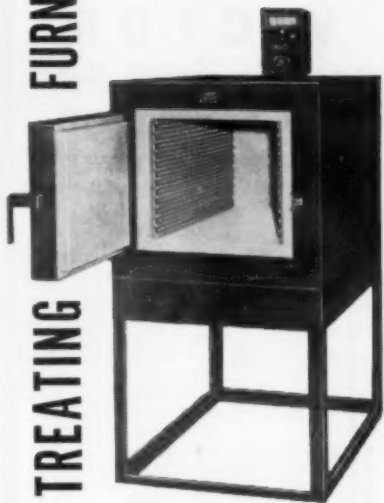
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The Lucifer 7055 Series was designed for hardening, annealing, drawing, preheating and special applications. Produced in 13 standard models with heat ranges of 2,000°F. and 2,300°F., the 7055 Series operates on standard line voltage. No transformer is necessary. All models include . . . automatic controls, thermocouple, lead wire, magnetic contactor, horizontal swing door or vertical lift door, positive seal cam lock, cast hearth plate, long-life elements (low watt density), and our exclusive one piece monolithic holders that permit rapid element replacement at a minimum of downtime.

For a free brochure or engineering advice, write, wire or call . . .

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SIZE	PRICE	SIZE	PRICE
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9/64	1.75	7/16	3.30
5/32	1.75	29/64	3.60
11/64	1.85	15/32	3.60
3/16	1.85	31/64	3.60
13/64	1.95	1/2	3.60
7/32	1.95	33/64	4.20
15/64	2.05	17/32	4.20
1/4	2.05	35/64	4.80
17/64	2.15	9/16	4.80
9/32	2.15	37/64	4.75
19/64	2.25	19/32	4.75
5/16	2.25	39/64	5.00
21/64	2.50	5/8	5.00
11/32	2.50	21/32	5.40
23/64	2.75	11/16	5.80
3/8	2.75	23/32	6.25
25/64	3.05	3/4	6.75
13/32	3.05		

**18" OA, 13 1/2"-14" FLUTE**

SIZE	PRICE	SIZE	PRICE
3/16	4.00	9/16	8.75
7/32	4.10	19/32	9.50
1/4	4.10	5/8	10.00
9/32	4.75	41/64	11.00
5/16	4.75	21/32	11.00
11/32	5.25	43/64	12.00
3/8	5.25	11/16	12.00
13/32	6.00	45/64	13.00
7/16	6.00	23/32	13.00
15/32	6.50	47/64	14.00
1/2	7.00	3/4	14.00
17/32	8.50		

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**Hydra-Feed Lathe**

A new color and sound motion picture entitled "Key To Machining Versatility" presents the Bullard Hydra-Feed lathe. The film clearly demonstrates the versatility of this machine tool, either as a tracer or multiple tool model.

Reservations for showing the film can be made by contacting the advertising department of the Bullard Co., Bridgeport 9, Conn.

**NMTBA Lists**  
**Films Available**

Of the 147 motion picture films on machine tools and machining operations listed in a 26-page booklet just published by the National Machine Tool Builders' Association, 84 are in color. Ranging in showing time from 5 to 70 minutes (average time about 30 minutes), all films are available without charge upon request to the member companies producing them.

With few exceptions, all films are 16mm., with sound. Many are in such demand that it is suggested requests for their use be made three to four weeks in advance of an intended showing.

Copies of the new booklet listing the films are available from the National Machine Tool Builders' Association, 2071 East 102nd St., Cleveland 6, Ohio. Requests for an individual film, however, should in all cases be directed to the member company concerned.

**IMMEDIATE DELIVERY!**



Cadmium plated, large selection of styles and sizes. Specials on request. Send for FREE catalog.

**MACHINE PRODUCTS Corporation**

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MACHINE and TOOL BLUE BOOK



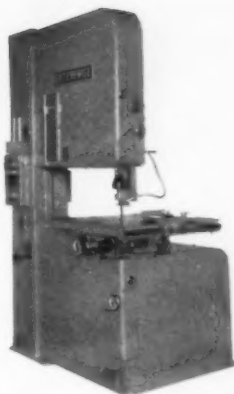
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## **36-inch Band Sawing, Filing and Polishing Machine**

- Tool selector for 57 different materials
- Convenient front controls
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- Foot-controlled automatic feed
- Aluminum disc wheels reduce fly-wheel effect
- Upper wheel moves on machined dove-tailed ways
- No main power waste; separate air pump
- Built-in band welder with grinder and shear
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**\$4595** including built-in welder

A custom-built metal supply cabinet is optional equipment.



Enterprise 36-inch Band Sawing, Filing and Polishing Machine ..... **\$4595**, including built-in welder. A custom-built metal supply cabinet is optional equipment.

Available through exclusive distributors in principal cities.

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Enterprise  
36-inch  
Band Sawing,  
Filing and  
Polishing  
Machine**



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**PRODUCTION Turning**

## **SHELDON** *Precision* **TURRET LATHES**

An extremely versatile, capable and fast, production tool for turning precision parts. Increases pieces per hour, lowers cost per piece. Lower tool investment, saves floor space, reduces power costs. Easily operated by anyone. Rapidly pays for itself in added profit. The extra capacity makes the lathe ideally suited for either high speed precision collet work or as a chucker.

This tool can be your answer to today's competition.

10", 11" and 13" Sheldon Lathes • Sheldon Variable-Speed Lathes • 13" and 15" Sebastian Geared Head Lathes • Sheldon Milling Machines • Sheldon Shapers.

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- ★ Push Button speed selection
- ★ Heavy duty power driven variable speed drive
- ★ Handwheel 6-station, 6 1/2" stroke bed turret
- ★ Lever-operated cross slide with front and rear tool blocks
- ★ Lever-operated 1-1/16" draw bar collet attachment (1 3/8" hole through spindle)
- ★ Zero-Precision taper roller spindle bearings
- ★ 13 1/8" swing over bed ways
- ★ 2-HP Motor
- ★ Complete Line of accessories and attachments

**SHELDON MACHINE CO., Inc.** 4242 N. Knox Ave.  
Chicago 41, Illinois

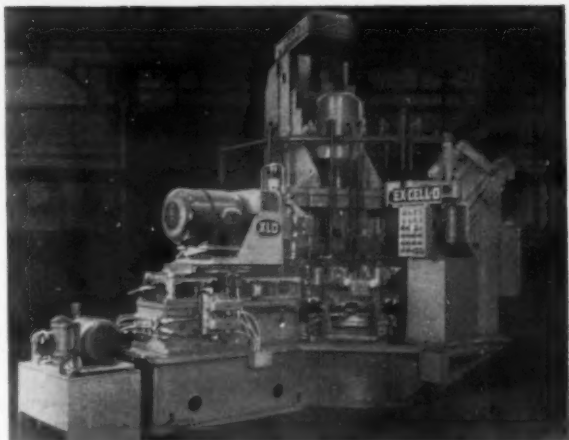
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### Eight-Station Rotary Handles 24 Machining Functions

This custom 8-station rotary index machine is processing oil pump bodies at a net rate of 68 pieces per hour. Machining operations are performed in both sides of the pump body and include spot facing, milling, drilling, tapping, reaming and core drilling. The material is gray iron, and critical dimensions—both roughing and finishing—are held to close limits.

The machine table is arranged with a set of eight 2-position work holding fixtures. Each side of the fixture is equipped with an individual set of hydraulically operated, cam locked clamping members and manually actuated back-up jacks to rigidly hold and support the part. In order to perform the operations required on each side of the workpiece, the body is initially mounted in the l. h. side of a fixture and cycled through the machine. Upon returning to station 1, the part is then re-loaded in the r. h. side of the fixture and re-cycled through the machine.

The machine base and columns are of welded steel construction. A shot pin locates the indexing work table. Station 1 is, of course, reserved for loading and re-loading. Station 2 is arranged with a horizontally mounted slide for milling the flat surfaces of the part. A vertically mounted drill head and bushing plate assembly per-



Over-all view of the 8-station rotary index machine showing the machining slides in relation to the indexing worktable.



Performs operations on this cast-iron pump body.

forms a series of drilling and reaming operations at stations 3, 4, 5 and 6. An angularly positioned unit is utilized to bore the cored hole at station 7 and a vertically mounted head carries the taps at station 8.

Machine was built by the Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

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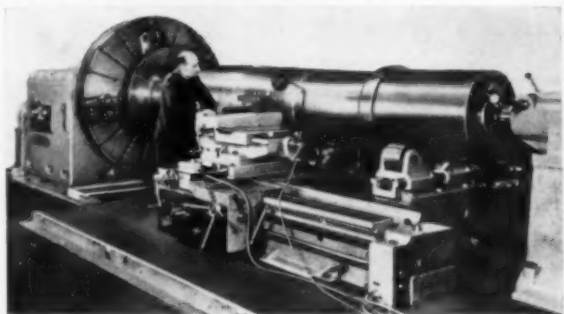
## Faceplate Lathe for Large, Light Workpieces

Ravensburg faceplate lathe with baseplate is reported to provide an efficient and relatively inexpensive means of machining extremely large yet comparatively light workpieces. Its most economical application is in the turning and facing of large diameters, e.g., in the machining of missile bodies, steam turbine runner discs, and generating plant, mining and shipbuilding equipment.

Headstock, baseplate and bed units can be built to meet specific requirements. The headstock is supplied with a 12-18 step gearbox containing hardened and ground gears; it is also available with mechanically or electrically controlled stepless speed variators. The baseplate is not connected to the headstock and has a built-in tailstock slideway. In addition, combined V-flat ways are provided for centering the bed either parallel or perpendicular to the turning axis. For machining long tapers or nose cones, provision is made to position the bed at any angle to the turning axis.

Saddle and cross-slide feeding is available in either inches/min. or inches/rpm. Feed gear drive originates from the main gearbox by means of an electrical shaft system that eliminates any mechanical connection between bed and headstock. Thus, only an electric cable is connected to the separate feeding motor on the saddle, so that a true and accurate feeding motion is reproduced as a function of spindle rpm.

The upper slide on the cross slide is mounted on a turn-table and feeds automatically at any angle within 360°. The top toolholder slide is hand adjust-



Ravensburg lathe. Economically turns and faces missile bodies.

able. The cross slide can also be provided with an optional hydraulic or electronic-hydraulic copying attachment for accurate reproduction of contours from a template.

Turning diameter over baseplate, 80-110 inches. Turning diameter over pit, according to pit depth. Weight of workpiece, unsupported, center of gravity 12" from faceplate, 6500-20,000 lb.

Cosa Corp., 405 Lexington Ave., New York 17, N.Y.

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## Surface Grinder for Close Tolerance Work

This extremely close tolerance surface grinder, for work on instruments, electronics and watches, features wheel head elevation control which is said to read to .0001" by means of a vernier. Transversal vernier is reported to read to .0005". Very fine laminations on the magnetic chuck securely hold the smallest parts. There is a built-in demagnetizer.

The wheel head elevating mechanism is totally enclosed against grit and dirt. The spindle is mounted on four selected ball bearings and has provisions for automatically removing play.

Specifications include: magnetic chuck surface, 4½"x6"; table travel, transversal, 4¼", longitudinal, 8"; vertical



Close tolerance surface grinder.

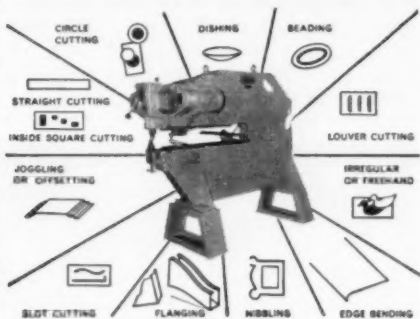
movement of wheel head, 5"; diameter of grinding wheel, 4 $\frac{3}{4}$ ". The maximum height between chuck and wheel is 4". The weight of machine is 230 lb. without pedestal.

The American LIP Corp., Room 704, 610 Fifth Ave., New York 20, N.Y.

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## A COMPLETE SHEET METAL SHOP IN ONE MACHINE **PULLMAX** DOES ALL OF THESE OPERATIONS



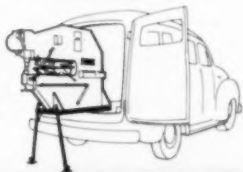
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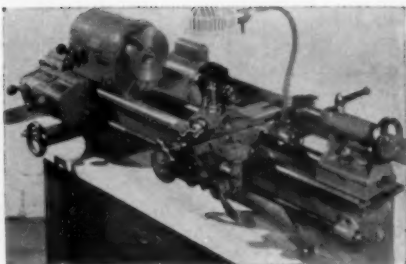


**AMERICAN PULLMAX CO., INC.**

2473 N. Sheffield Ave., Chicago 14, Ill.  
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## Metal Lathe Features Variable-Speed Drive

A Delta 10" metal cutting lathe for heavy duty work features a variable-speed drive and  $\frac{3}{4}$ " collet capacity. The drive is said to give the operator all the advantages of infinitely variable speed from 50 to 1500 rpm, plus the high torque transmitting power of matched V-belts in the final drive to the spindle. The  $\frac{3}{4}$ " collet capacity, re-



$\frac{3}{4}$ " collet capacity



## WHAT CAN THEY DO FOR ME?

In a word, plenty.

They can make your taps last up to six times longer.

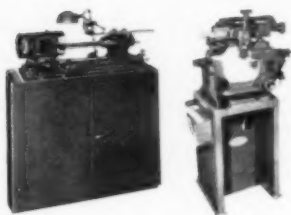
They reduce work spoilage because they enable taps to cut more accurately, more uniformly, with less strain.

They can cut your present tap costs up to 65%.

We didn't get these facts out of thin air. They come from actual case histories in metal-working plants where taps are sharpened regularly with Blake Flute and Chamfer Grinders.

These are high-precision machine tools. But they are not expensive. And they're simple enough to operate so that anyone in your plant can become accomplished at precision tap grinding with a minimum of fuss and feathers.

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Blake Chamfer Grinder/Blake Flute Grinder

Blake — and only Blake Flute and Chamfer Grinders, used in combination, create or restore: 1. exact indexing of cutting edges 2. controlled rake angles for each job 3. correctly ground spiral points 4. perfectly relieved chamfers . . . make one tap do work of six!

EDWARD **BLAKE** COMPANY, INC., 440 CHERRY STREET, WEST NEWTON 65, MASS.



ported as larger than any other lathe in its class, is obtained by using a 4-C style collet with a 15/16" hole through the spindle.

Features include a massive, double row, preloaded, inboard spindle ball bearing which is reported as sealed against dirt and lubricated for life; a quick change gear box which provides a choice of 54 feeds or thread pitches, and the variable-speed drive which can

be preset on the job to whatever high or low speed limit is desired in either direct or gear drive.

The lathe is used with a full 3/4 hp motor and optional Delta bench which has adequate space for separate mounting of the motor.

Rockwell Manufacturing Co., Delta Power Tool Div., 451 N. Lexington Ave., Pittsburgh 8, Pa.

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The quadrill performs all these operations without setting up each time. Any of four cutting tools can be brought into drilling position by indexing the turret. A real time and cost saver!

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## ENCO Self-Indexing HEXTURRET

Convert your lathes for turret work this quick, easy way. ENCO HEXTURRET gives you the accuracy, rigidity and speed you need to step up lathe production and cut "per piece" costs. Easy as mounting your lathe tailstock. Does both normal and heavy lathe and screw machine work, drilling, counter boring, counter sinking, spot facing, reaming, turning, boring, etc. Fit all lathes 9" to 16" swing.

Mail coupon for cat. #53 and name of nearest Enco Franchise Dealer.

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Please send catalog #53 and full details of ENCO HEXTURRETS.

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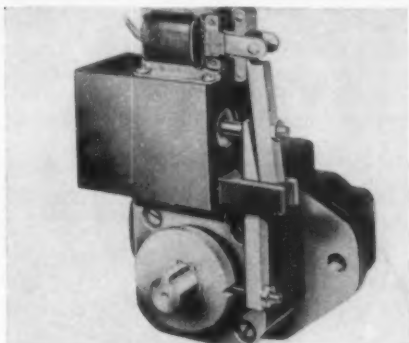
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Fluid powered one revolution drive produces smooth, quiet, instant high torque through fluid motor, planetary reduction and solenoid actuated starter. Has built-in valve to compensate dur-



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Applications: An accurate and automatic intermittent drive for indexing motions, feeders, turntables, packaging machinery, office equipment, and unlimited others.

Constant-Flo Div., John S. Barnes Corp., 301 S. Water St., Rockford, Ill.

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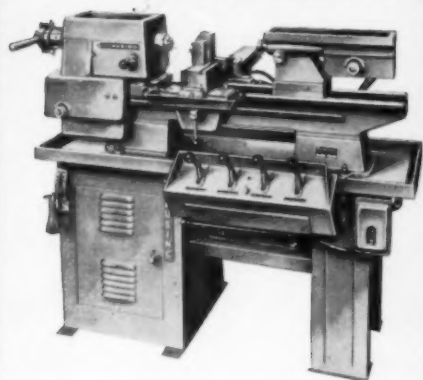
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12 1/4" swing, 1-1/16" collet capacity, ASA—L-00 spindle nose, "Zero Precision" Timken tapered roller bearings, flame hardened bed ways, ball bearing collet closer, 1 1/2 constant HP two-speed motor.

## Hi-Speed (3200 RPM) Lathes with Hydraulic Feeds Variable Speeds

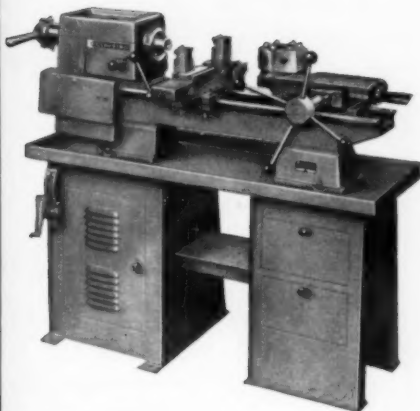
- infinitely variable spindle speeds — up to 3200 RPM.
- hydraulic feeds on carriage, double tool cross slide, tailstock ram.
- each feed is independent and infinitely variable.
- requires minimum of mechanical skill to produce precision parts — feeds are controlled thru levers, positive stops assure accuracy.
- low price includes machine, electricals and hydraulic system — completely assembled, wired, ready for installation.

The new Clausing is a first! There's nothing like it, and its productive capacity is sensational. Send for complete details today.

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- six models, with choice of lathe with six-station Timken bearing equipped bed turret and double tool cross slide . . . with double tool cross slide and tailstock with lever-and-wheel feed . . . or with precision compound and tailstock with lever-and-wheel feed.
- 12 1/4" swing, 1-1/16" collet capacity, ASA—L-00 spindle, Timken "Zero Precision" tapered roller bearings, flame hardened bed ways, ball bearing collet closer.
- built to rigid specifications for precision performance.
- outstanding in value — low price includes motor and electricals, with machine assembled, wired, ready for installation.

The new Clausing are FAST . . . HIGHLY ACCURATE . . . and LOW IN COST. They'll pay out quickly in your production department, tool room or laboratory. Investigate before you invest in any high speed lathe.



1-1/16" collet capacity hi-speed hand turret lathe illustrated above.

Also available: Clausing hi-speed lathes with 1/2" collet capacity, spindle speeds from 250 to 3500 RPM. Prices, with electricals, start at \$935 f.o.b. factory.



**CLAUSING DIVISION**  
ATLAS PRESS CO.

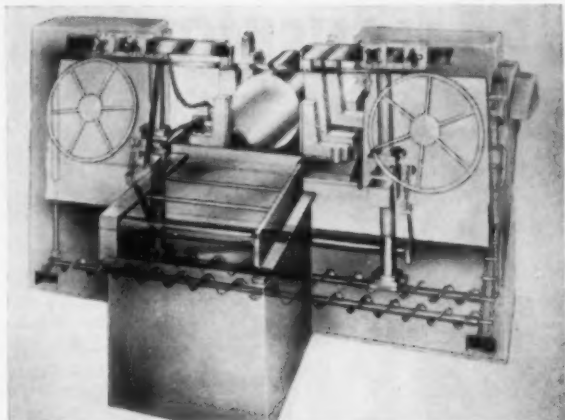
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KALAMAZOO, MICHIGAN

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## Heavy Duty Band Machine Adapts to Diverse Applications

The Model C-24 power saw, available with a selection of work handling devices, integrates a 24" x 24" capacity cutting head, main vise, hydraulic system, coolant system and movable control console. A 15 hp drive furnishes ample power for the cutting potential of 2" wide Demon high-speed steel saw band. A hydraulic motor drive provides variable tool speeds of 20 fpm to 200 fpm saw band velocity range. The controls for the drive are in a movable console, enabling the operator to always view the work from his control station. A tachometer and infinitely variable speed and feed controls enable him to monitor



Drawing shows how power, rigidity is provided for 2" hss saw band.

the operation for maximum cutting rates and saw band life. Console mounting of the vise controls and work handling controls gives supervision of whole job.



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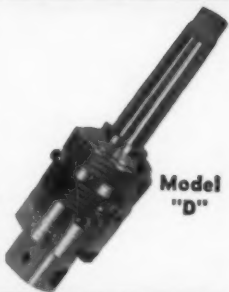
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The basic machine includes a roller table on the load side of the saw band with or without powered rollers. Up to 60 ft. of powered conveyor tables can be added to both the load and unload side of the basic machine, and additional runout tables can be added to the motorized units as far as required. The powered conveyor tables are reversible and controlled from the main control console. Either standard 3400 lb. or heavy duty 10,000 lb. capacity rollers

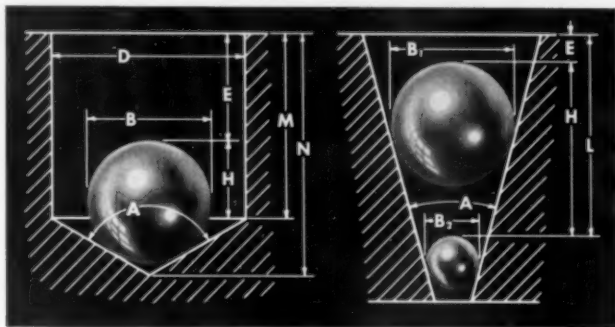
may be specified, and they may be hardened and ground for severe applications.

DoAll Co., Des Plaines, Ill.

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### Miniature Parts Grinder

The Miniature Centalign Model B internal grinder is built specifically for grinding bores in miniature bearing races and internal ball tracks in miniature bearing outer races. Of com-



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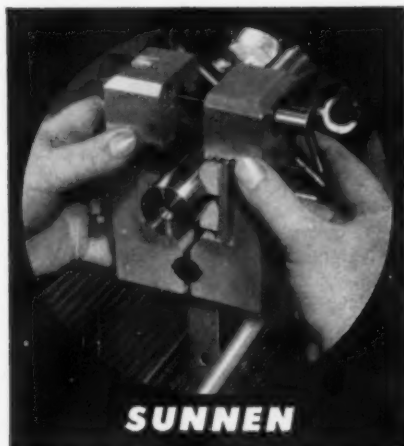
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Miniature Centalign Model B internal grinder.

compact design, the machine requires only 8 $\frac{1}{4}$  sq. ft. of floor space.

Workpieces are automatically loaded, ground and unloaded by means of the new disc drive shoe centerless fixture, which provides interchangeable "packaged tooling" that can be set up away from the machine if desired. This allows almost uninterrupted machine operation and eliminates the need for long periods of downtime required to retool for workpart changes.

Bryant Chucking Grinder Co., Springfield, Vt.

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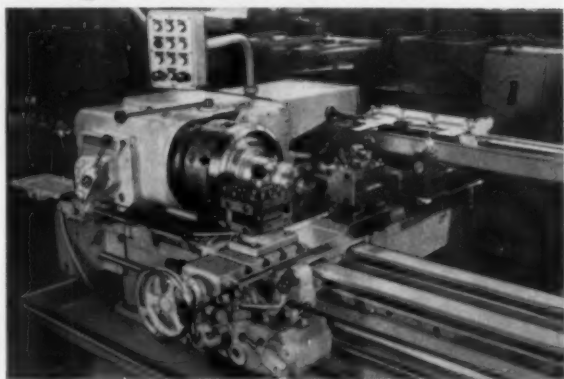
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## Two Dimensional Carriage Tracer for Turret Lathe

This hydraulically controlled tracer offers four automatically controlled tracing cycles. It will trace through 180° of tool travel while turning, with feed being either toward the headstock or away from the headstock. It will also trace through 180° of tool travel while facing, with feed being either toward the spindle center line or away from the spindle center line. Roughing and finishing tracing tools can be used from the indexing square turret.

Complete size control for diameter is accomplished with the conventional graduated hand wheel for either tracing or mechanical operations.



Tracer offers four automatically controlled tracing cycles.

The tracer can also be used as a taper attachment. With a suitable threading device, it will produce tapered threads.

Feed limits are from 1/2" to 18" per minute. Feed can be changed by a



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single control, even while machining. Turning capacity of the tracer is the same as the mechanical capacity of the machine in 20" increments. Facing capacity in either turning or facing cycles is up to 6" radius change.

Jones & Lamson Machine Co., Springfield, Vt.

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### Automatic Numbering

A new combination marking and numbering machine meets REA re-

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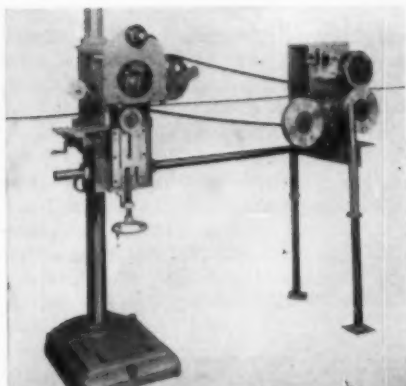
After one year's operation, Mohr Lino Saw says this about their *low-cost* Torit installation: "The Torit installation has kept our shop *cleaner*, our operators *happy*, and *protected vital machinery*."

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Consecutive footage marking on trench wire, cable, head advances consecutively and numbers every two feet: 1002, 1004, etc. The die holder is located 180° from the numbering head in the rotating member and both the numbering and marking members are heated by means of a radiant heater with three-step heat control.

Characters are  $\frac{1}{8}$ " size and numbering head has to be reset every 99,998 feet. Cable sizes of  $\frac{1}{8}$ " to 3" diameter are marked at speeds of about 300 ft. per minute.

The Acromark Co., 15 Morrell St., Elizabeth, N.J.

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Model MP-20 separator with trough type distributor tank and pump.

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magnetic and fabric coolant filters features increased clearance between the filter fabric and distributor, which provides increased capacity for handling heavy swarf loads.

A separate sun gear on the drum drive shaft has been provided for ease of adjustment. Other changes include the relocation of the drip plate to give greater clearance and better operation of the conveyor. Two supports at the base give lifting support during instal-

lation or moving, without damaging the conveyor belt and filter mechanism.

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Barnes Drill Co., Rockford, Ill.

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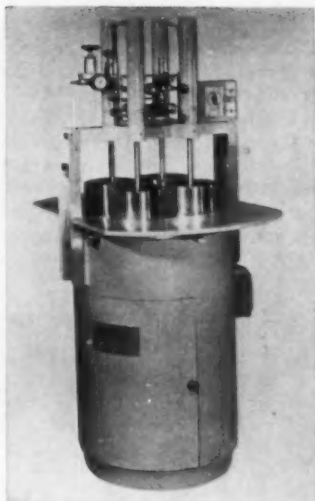


For drilling, tapping, milling, sawing, grinding, etc. Removes heat from cutting edges of tools and work. Feeds can be increased considerably, finer finishes and accuracy are obtained. TRICO-MIST absorbs heat, thereby quenching it faster than flood coolants which only transfer it. Chips slide freely up the tool face and are blown away automatically. Simple needle valve controls size and volume of mist spray. Attaches to shop air line. Available with one and five gallon containers — single or multiple outlets — single or dual valve control.

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 MILWAUKEE, WIS. U.S.A.

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machine as optional equipment. It can be added at a slight extra cost to existing machines.

The machine, equipped with the air system, can readily lap such materials as carbide, ceramics, semi-conductors, aluminum, and other common materials. Like the larger Speedlap 32, parts are ready for lapping as sintered, cast, stamped or turned.

The machine is suited for aircraft and missile parts, electronic components, instrument parts, as well as valve and seal faces.

Abrading Systems Co., 8020 N. Monticello, Skokie, Ill.

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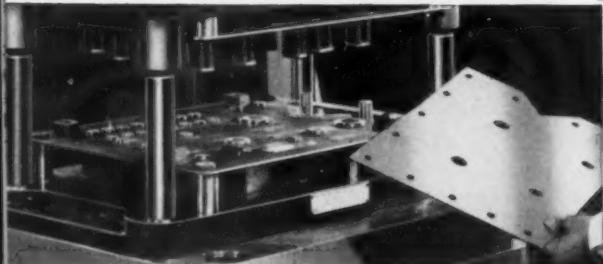
Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

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MACHINE and TOOL BLUE BOOK

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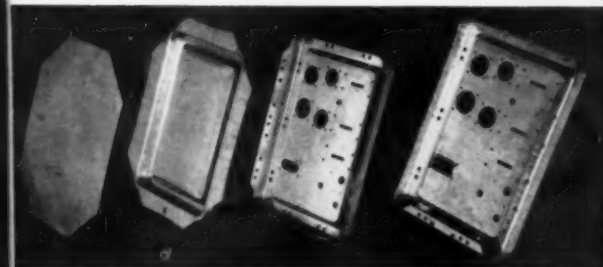
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## Internal Lapping Arrangement for Air Brake Parts

A Lapmaster Model 24 is shown equipped with a five-station lapping attachment for lapping of air brake valves and other air equipment. This radially mounted fixture permits lapping of valve faces on lapping table while reciprocating blocks internally lap valve seats. When the small lapping blocks go out of flat, they are brought into perfect flatness by reconditioning on lapping table.



Lapmaster Model 24, with five-station lapping attachment.

The Lapmaster, equipped with this multiple fixture, is reported to permit precision lapping of a wide variety of internally lapped surfaces simultane-

ously at a substantial cost reduction over hand lapping.

Crane Packing Co., Morton Grove, Ill.

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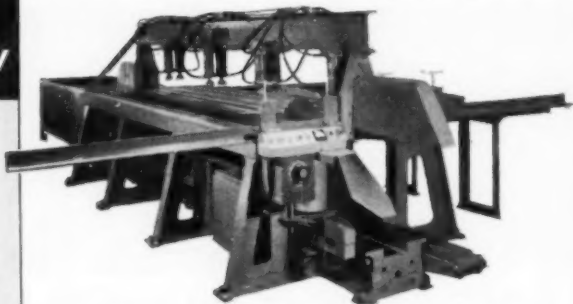
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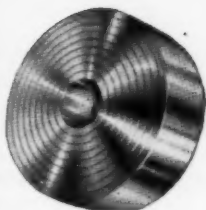
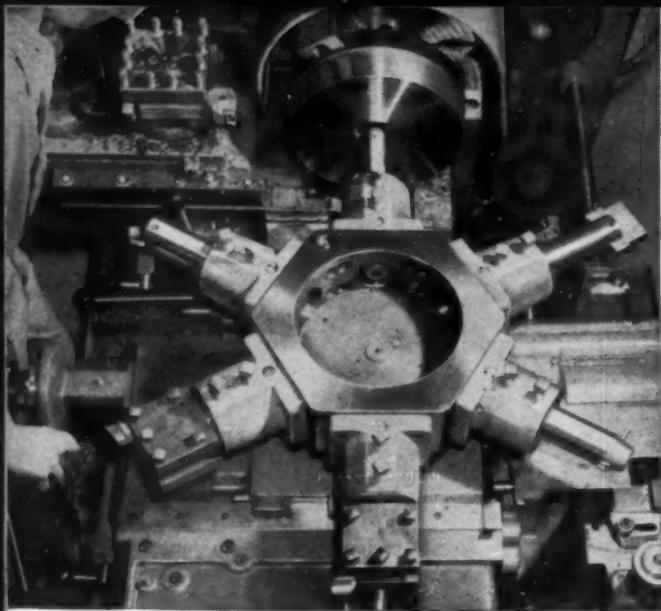
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## Expert setup gets more work per chucking

**How manufacturer uses C/F turret lathe to produce variety of chuck bodies with only one tool change**

To the job, the manufacturer selected a Gisholt 1L Saddle Type Turret Lathe with a cross-feeding hexagon turret. A 15" 3-jaw air chuck holds down chucking time. A set of adjustable serrated jaw bases handles the different workpiece sizes for first machining operations. A quick-indexing square turret on the cross slide carries facing, facing and chamfering tools, which work simultaneously with tools on the hexagon turret.

Three stub boring bars on the hex turret bore, counter-recess and back face. Because size is set with the cross-feeding turret, these same boring bars are used on different part sizes. Also on the hexagon turret are 2 type tool posts for facing, boring or recessing—used on different size workpieces because of the cross-feeding

feature. A threading attachment lets the manufacturer thread the hubs, and a taper attachment handles up to 8 inches taper per foot when required.

The sixth tool on the hex turret, a spade cutter, is used for final sizing and is the only special tool changed for each job.

Simple, low-cost tooling combined with the cross-feeding hexagon turret offers maximum efficiency in handling various sizes of similar parts. The rugged Gisholt MASTERLINE Saddle Type Turret Lathes have the speeds, feeds and power to complete the work in the least amount of time. Call your Gisholt Representative today, or write Gisholt for literature.



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## MACHINE COMPANY

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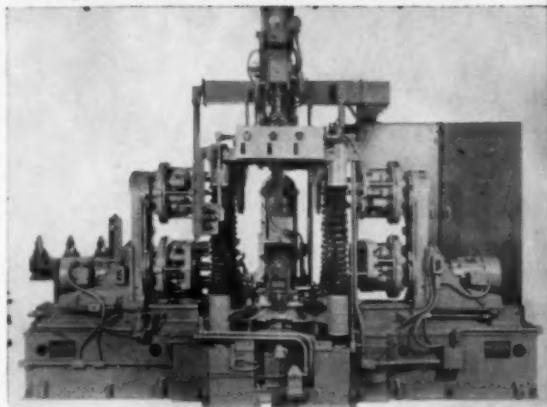


## Four-Way Machine Accepts Ten Different Part Sizes

Four-way vertical indexing drilling and tapping machine features a 20-inch square fixture mounting area which raises and lowers automatically to various machining stations. Developed for a motor manufacturer, the versatile machine accommodates ten different motor frame bracket sizes.

Utilizing three 12" way type hydraulic drill units and an Air-Oil-Matic drill unit equipped with a turret head, the machine makes 21 drilling and 21 tapping operations in one completely automatic cycle. The operator simply loads the part and presses the cycle start.

The cycle takes only 30.5 seconds.



Fixture mounting area raises, lowers automatically to various stations.

To adjust the fixture to the different frame sizes, the operator simply interchanges the fixture adapter plate, which compensates for the various centerline heights of the parts, and adjusts the

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fully adjustable for dependable  
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5 models to choose from —

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- Chrome nickel universal ball joint type spindles.
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clamping fingers. Slip spindle heads are utilized to facilitate altering of the various spindle centers required.

Morris Machine Tool Co., 2011 East-  
ern Ave., Cincinnati 2, Ohio.

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Can-Pro accordion way guards, made to specifications, protect ways, cross rails, moving and sliding assemblies

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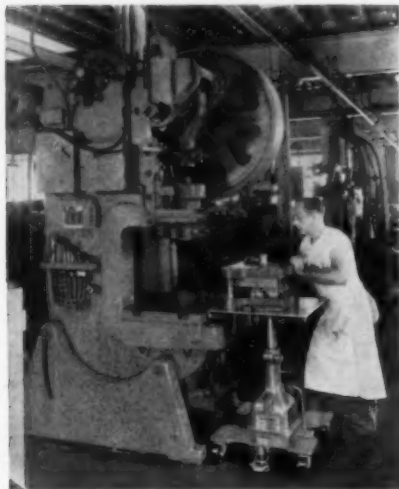
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better than Neoprene, the guard manufacturer claims. The material has a high degree of flexibility and softness which permits the guards to be compressed into small spaces. It will withstand temperature changes from -45°F to 220°F without cracking.

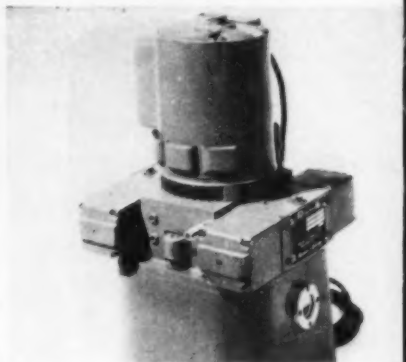
The way guards are designed to expand and compress equally with the movement of the machine, regardless of position: vertical, horizontal or angular. This feature (each accordion fold expanding equally and simultaneously) helps to double life of guards.

Can-Pro Corp., Fond du Lac, Wis.

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## Hydraulic Power Unit Is Manifold-Circuited

Circuitpak, a low-cost hydraulic power unit, is manifold-circuited for



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MACHINE and TOOL BLUE BOOK

direct connection to cylinder lines.

Four pump capacities from .8 to 5 gpm are available with 1, 1½ or 2 hp capacitor-start electric motors and up to four solenoid-operated four-way valves. Operation is at 3600 rpm with pressures up to 1000 psi.

Circuitry employs series connection of valves, and oil is blocked from all valves farther down the circuit when any valve in the series is shifted. Return lines are ported directly to the

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Brown & Sharpe Mfg. Co., Providence, R.I.

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A 700-ton, double-acting hydraulic press is reported to hold parallelism to

## The WELLS Model 600 Metal Cutting Band Saw

for  
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for  
Medium  
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Conical grinding of a drill point produces the same clearance angle from O.D. to web. The drill enters the work easier, cuts a uniform chip that requires less pressure, less power.



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90°—140° Included angle, variable clearance angle set with built-in gage. Grinds 1/8" to 2 1/2" drills; 2, 3 & 4 flutes.

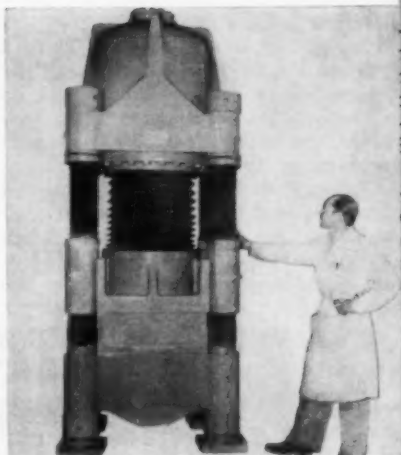
Set-up is simple and fast because no chucks or collets are used. Built-in diamond wheel dresser produces a finished cutting edge that stands up longer. You get more, accurate holes with drills ground on a STERLING "DV".

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Hydraulic press.

less than .002" over the full area under full load. Specs. include: down-acting 21" daylight, 15" stroke, usable platen area of 26"x30". Strokes up to 60", and controls to fit individual requirements are available.

Allied Engineering and Production Corp., 2421 Blanding Ave., Alameda Calif.

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## Automatic Machine Forms Conical, Contoured Parts

The No. 12 vertical Floturn machine is specifically designed for high production of parts ranging up to 16" in

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*Precision*  
**DIE SETS**

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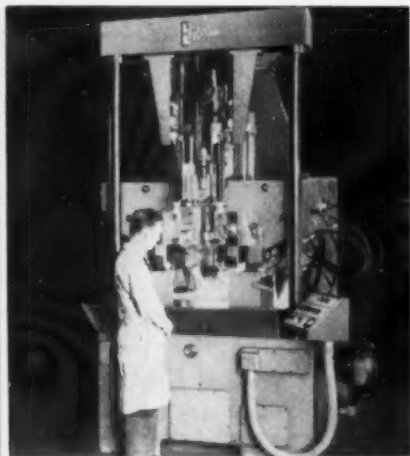
**DANNEMAN DIE SET DIVISION**

Acme-Danneman Company, Inc.

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MACHINE and TOOL BLUE BOOK



Vertical Floturn forms parts to 16" dia., 15" long. diameter and to 15" in length. It features an automatic cycle which may include automatic loading and unloading. The vertical design incorporates radially opposed "Dual-Sincro" rollers

which are claimed to virtually eliminate deflection and assure extreme accuracy. Automatic hydraulic tracer control is provided to make production of complex shapes a push-button operation.

The machine produces conical, cylindrical, contoured shapes or combinations of these shapes from flat blanks, preformed blanks or machined blanks, working virtually any metal or alloy with speed and ease.

The metal-flowing rollers are synchronized; they work in the same plane, opposed to each other to eliminate deflection. The machine works on the sine law (where the sine is the instantaneous angle between the centerline of the spindle and the tangent to the contour at the point of roller contact).

Manual loading and unloading is expedited by the easily accessible working area. Setup has been simplified to require as little as 45 minutes time.

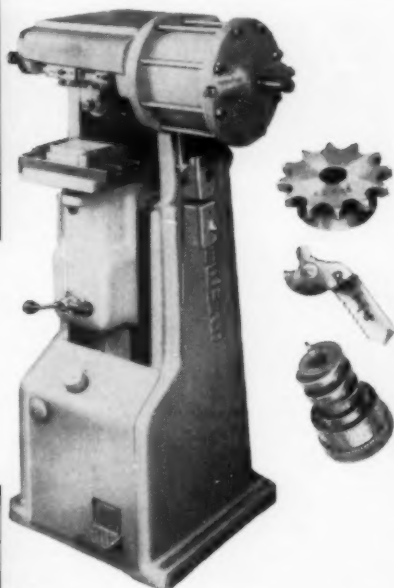
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chine's ram (which holds the work-pieces) and the template supports automatically adjusts template position to compensate for the smallest practical variation in blank thickness. When the variation is not compensated, the manufacturer states, as little as .003" variation may result in unacceptable work-pieces, particularly on thin-wall pieces.

The Lodge & Shipley Co., 3074 Cole-rain Ave., Cincinnati 25, Ohio.

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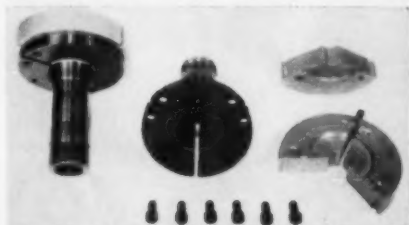


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## Step Collet Cuts Costs 80%

This step collet, comprised of a master collet with replaceable jaws, can reduce collet costs 80%, the manufacturer reports. The unit fits all lathes using standard 5C collets. Precision machined



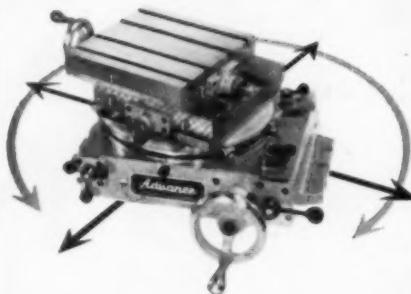
Step collet fits lathes using standard 5C collets. radial groove affords accurate relocation of jaws for rerun jobs, thus saving time and effort in setups.

Soft jaws are finished in steel and aluminum. Special jaws in plastic teflon, brass or other material provide universal application for delicate work.

Crest Precision, El Monte, Calif.

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### High-Priced RESULTS for LOW-COST Investment

The Advance Cross-Slide Rotary Table permits fast, precise positioning of work-pieces from one set-up. Eliminated is the series of error-inducing multiple set-ups as done on conventional rotary tables.

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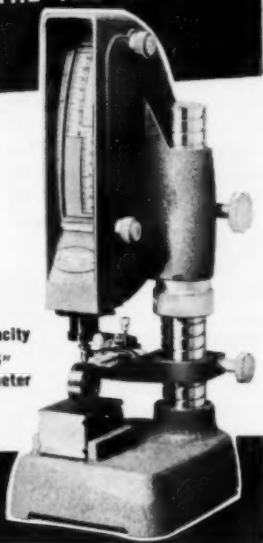
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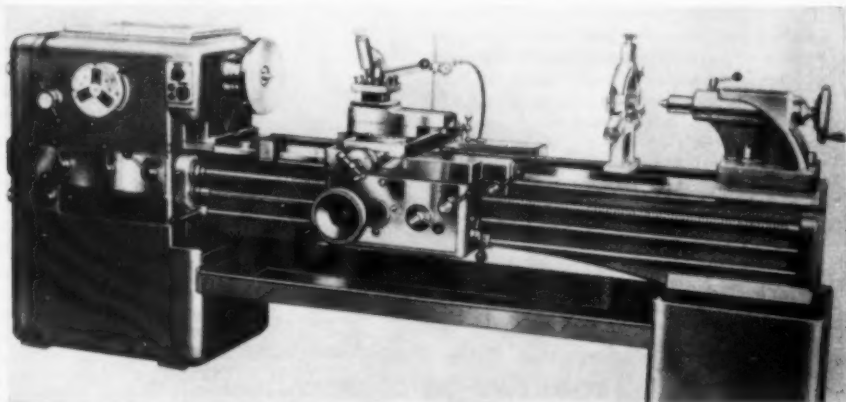
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### Precision Lathe for Toolroom and Production Jobs

The 19" Sabre all-gear head, precision gap bed lathe features: direct multiple V-belt drive; electrical equipment and controls; built-in electro magnetic brake for fast stops; 6/8 hp motor—

3/60/220. Headstock has standard range 12 spindle speeds, 20-1100 rpm. Quick-change gears provide 24 feeds.

Index Industrial Corp., 150 Broadway, New York 38, N.Y.



19" Sabre lathe. Twelve spindle speeds; 24 feeds.

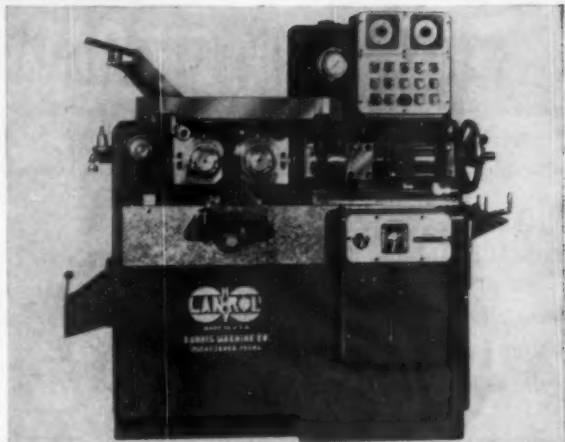
## Thread Rolling Machine Handles Double End Studs to 13-1/2"

A Lanhyrol thread rolling machine has been developed to handle double end studs up to 13 1/2" in length. Through extended spindles, the machine will produce these studs at rates of 102 3/8" to 9/16" and 80 5/8" per minute.

The operation is performed by the continuous rolling method whereby the parts are automatically fed into the machine from an inclined magazine. They are held and carried into rolling position by an indexing workrest cage.

The thread roll dies are of the segmental type operating at a fixed center distance and held there

hydraulically. Two parts are rolled per die revolution. Upon completion of the



102 3/8" to 9/16" studs and 80 5/8" studs per minute.

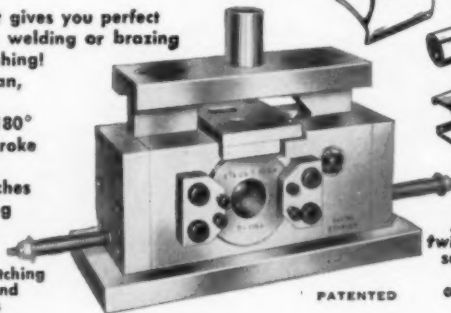
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threading operation, the parts drop into a conveyor and are carried out the front of the machine.

Two methods of rolling are available. The first and fastest is by segmental or cam periphery dies with mechanical indexing for parts up to and including  $\frac{3}{8}$ " diameter on either single or double end work and for  $\frac{3}{4}$ " diameter, single end only. In this range, combinations of coarse and fine pitches, left and right hand, large and small diameters

or identical threads may be rolled.

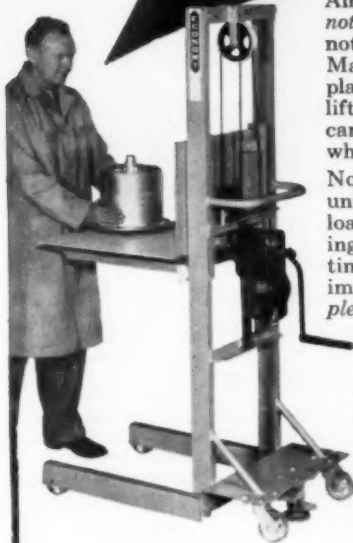
The second method available is used for work larger than  $\frac{3}{4}$ " in diameter on one end only. Plain cylindrical infeed dies are used with an automatic infeed cycle and electro-pneumatic indexing is substituted for mechanical indexing.

A change-over from one diameter to another requires only interchanging the thread rolling dies, magazine chute rails and work carrying rings in the

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\$195<sup>00</sup> FOB Chicago



All lifters at this price *are not* the same. Compare and note the quality of the new Mark II, which now replaces the Type D Shoplifter. Full 750 lb. capacity can be handled safely anywhere on the platform.

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indexing cage. Minor adjustment of the chute rails and indexing mechanism is needed when changing over to studs of different length but of the same diameter.

Landis Machine Co., Church & 5th Sts., Waynesboro, Pa.

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### Alarm Photographs Burglar in Action

Photolarm features a hidden camera that photographs the burglar in day-



Photo taken by Photolarm in total darkness.

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**The 3 purpose instrument with unlimited application  
in your inspection department**

Use as Dial Indicator graduated to read in .0001".

Use as Bore Gage covering a range of .200" thru 5.090" and reading in .0001".

Use as Dial Test Indicator graduated in .0005".

The No. 99 incorporates a high quality dial indicator together with all the necessary gage heads and extensions. It may be used directly at your machines or clamped to your fixtures. Furnished in handsome plush-lined case.

Dial Test Indicator Set No. 98, a modification of the No. 99, is especially designed for applications where measurements must be taken in deep holes, slots, etc. Write for detailed brochure.



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light or in total darkness with invisible light, and simultaneously rings a loud bell alarm. The unit is compact and camouflaged so thieves are unaware of its presence.

The device is easily installed by plugging into a conventional AC electric outlet.

Photolarm, Inc., 600 Michigan Bldg., Detroit 26, Mich.

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## Machining of Small Parts With Vertical Borer

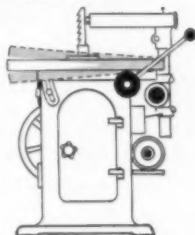
The sturdily constructed BV machine is reported capable of heavy cuts on castings and forgings as well as precision cuts of less than .0005 tolerance on finishing operations. Fourteen machines in the new BV series apply the building block principle to cam actuated precision boring.

A feature of the head and base assembly is clean sides which allow a



### WITH DAVIS KEYSEATERS!

You can cut accurate, low-cost internal keyways at *minimum* cost with Davis Keyseaters. Here's why: (1) operation is designed for production *speed*; (2) machine sets up easily, does *not* require skilled operator; (3) maximum concentricity of the keyway in each bore assured; (4) Built in 2 sizes. Keyways range from  $\frac{1}{16}$ " to 1". High speed steel cutters stocked in all sizes; (5) the *best* keyseater of its type, yet *inexpensive*! Write now for FREE DETAILED LITERATURE!



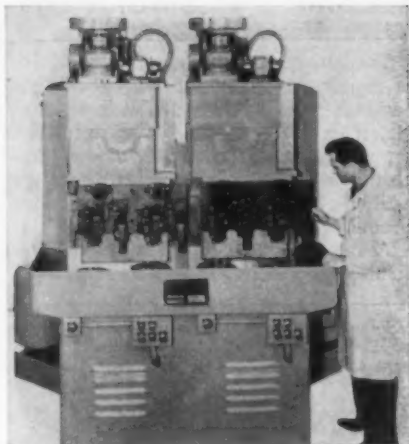
Tilting table sets easily for tapered keyways up to 3" per foot.



## DAVIS KEYSEATER COMPANY

DIVISION OF *Hansford* MANUFACTURING CORPORATION  
1239C UNIVERSITY AVE., ROCHESTER 7, NEW YORK

Use postpaid card. Circle No. 365



A two unit assembly on the vertical boring machine. number of independent units to be placed side by side and to be serviced by one operator.

Hoern & Dilts Division, The New Britain Machine Co., Saginaw, Mich.

Use postpaid card, Circle No. 102

## Rubberized Abrasive Kit for Tool and Die Makers

To introduce rubberized abrasives to tool and die makers, the Cratex Mfg. Co., 1600 Rollins Rd., Burlingame, Calif., has developed tool and die makers kit No. 777. "Although the use of rubberized abrasives is steadily increasing," says Cratex, "their advantages in solving sensitive deburring, smoothing and polishing problems are not widely known."

The kit contains the 80 wheels and points thought to be most useful to tool, die and mold makers and component parts manufacturers. They are packaged in a plastic box, compartmented for fast selection.

The wheels and points are equally assorted in four grit textures (coarse-C, medium-M, fine-F, extra fine-XF) and four mandrels for 1/8" chuck.

Use postpaid card, Circle No. 103

## Continental Pipe & Tube Cut-Off Wheels

### HI-ALLOY for LOW COST CUTS

More cuts between sharpenings—made of Shok-Resisto steel. For Continental and other rotary cut-off machines. Send for CUT-OFF WHEEL CHART . . . shows correct cutting bevels.

MACHINE RENTAL PLAN

**Continental**

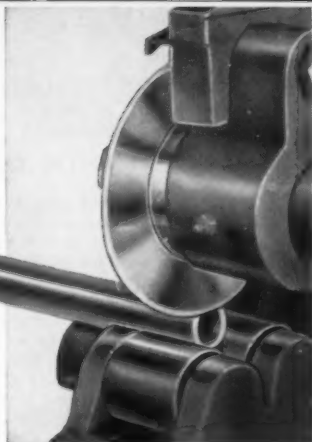
SINCE 1919

machine co.

2345 W. NELSON ST.

CHICAGO 18, ILL.

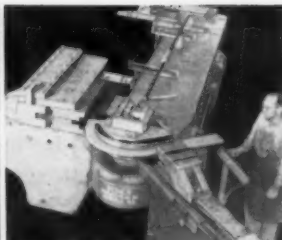
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WRITE FOR CATALOG



**HEAVY RECTANGULAR TUBES**—accurately formed on Pines Model 4 on a 34" inside radius for air cushion assembly on heavy duty truck chassis. Material is 4" x 5 1/2" x .500" wall.



**SOLID STEEL BEAMS**—cold edge bending of 5 1/2" x 1 1/2" steel bars on Pines Model 4 replaces hot bending on diesel, produces more accurate parts at lower cost for road machinery manufacturers.

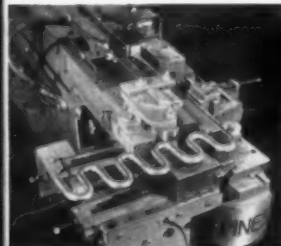


**ALUMINUM CHANNELS**—rugged machine construction and tooling on Pines Model 3 Machine cold forms 4" x 1 1/2" x .330" aluminum channel without wrinkling or distortion. Spring-back is controlled by simple machine settings.

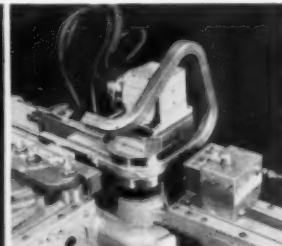
## FOR COST CUTTING IDEAS

### INVESTIGATE PRODUCTION BENDING THE "PINES-WAY"

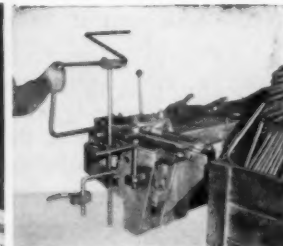
When you have a production job requiring the cold forming of parts from round, square, rectangular, extruded, or hollow stock to an even radius, or to different angles, we suggest you investigate the cost cutting advantages of production bending the Pines-way. The examples shown here illustrate a few of the many different and varied applications which are today profitably produced on Pines machines. Cold bending is a fast, accurate, easy to control metal forming process that is today more profitably applied in the production of an ever increasing variety of products. Call on Pines engineers for assistance without obligation on any specific job.



**COPPER SERPENTINE BENDS**—1/4" O.D. x .035" copper tubing is rapidly formed on this Model 1/2 into serpentine coils on a 1" ch. A simple gang-slitting operation produces 180° return bends.



**WRINKLE-FREE SQUARE TUBE BENDING**—Model 5 Machine, equipped with flexible mandrel and self-opening bending form, produces top quality office and hospital equipment at speeds of 550 bends per hour.



**FAST ROUND-TUBE BENDING**—Pines Model 5/8 Machines speed production of tubular dinette and lawn furniture. Fast, automatic cycling and accurate progressive bending produce 600 to 900 bends per hour.

**PINES** ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery 692 WALNUT • AURORA, ILLINOIS

**PRODUCTION BENDING • DEBURRING • CHAMFERING • MACHINERY**  
Use postpaid card. Circle No. 367

#### WRITE FOR FREE DATA SHEETS

To keep abreast with bending, write for free copies of "Pines News"—gives complete data on new production applications.





**HIGHER SPEEDS!  
FASTER GRINDING!**

**kipp**

## AIR GRINDERS

MODEL JA  
30,000 R.P.M.

**\$60.00**

IN U.S.A.



Weight 12 ounces;  
length 6 $\frac{3}{4}$  inches;  
chuck size  $\frac{1}{8}$  inch.  
Wheel guard removed  
for better illustration.

**THE SPEED** of Kipp Featherweight Air Grinders stays up where it belongs, under load, for efficient grinding even with small wheels. This may not be true with most of the "Plug-In" grinders you now are using.

**HAVE YOU GIVEN** your tool-makers a chance to save valuable hours by providing them with enough Kipp Featherweight Air Grinders and accessories?

**kipp**

**MADISON-KIPP CORP.**

207 Waubesa St., Madison 10, Wis., U.S.A.

Use postpaid card. Circle No. 368

## Decorating-Mask Washer

The functions of automatic spray decorating equipment combined with automatic, efficient mask washing are possible with this washing machine, useful for those who do spray finishing



Paints areas up to 6" x 6" square or diameter.

which employs masks with fine detail. It is of value also where a heavy material is used for decorating and only a few shots can be obtained on a mask before washing becomes necessary.

A clean, dry mask is made available in less than a second by the machine operation, and the operator need at no time handle the masks.

Areas up to 6" x 6" square or diameter can be painted.

Conforming Matrix Corp., 394 Toledo Factories Bldg., Toledo, Ohio.

Use postpaid card. Circle No. 104



### Write for **FREE** Catalog

- Ground Cut Rotary Files For Soft Metals.
- **HAND CHISEL** Cut For Hard Metals.
- Carbide Rotary Files
- Salvage and Regrinding Service
- Dealers Inquiries Invited

**Rota**

**FILE CORP.**

1328 58TH STREET  
BROOKLYN 19, N.Y.

Use postpaid card. Circle No. 369

This is a  
knock-out cavity bushing.



It is used in plastic injection  
molding.



It is manufactured by *FASTEX*,

Division of Illinois Tool Works, Des Plaines, Illinois.

It has a  $7^{\circ}30'$  internal taper.

It is ground from hardened  
tool steel, 58-60 Rockwell C

The tolerances must be held to  $0.0002''$

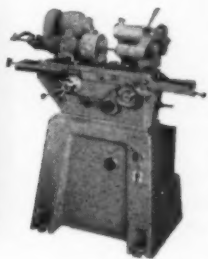


The grinder on which this bushing  
and all its cousins are made is a



**RIVETT LATHE & GRINDER, Inc.**

Dept. MTR 4 Brighton 35, Boston, Mass.

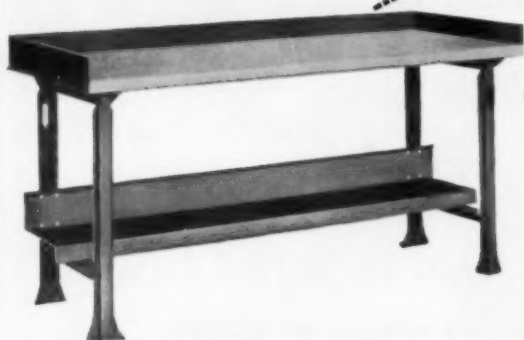


#### **Model 84**

An internal specialist  
with external ability.  
Mounts interchangeable  
wheelheads for  
internal and external  
spindles. Capacities  
are 3" diameters,  
depth 4". Collets and  
step chucks mount  
directly in lathe-type  
spindle.

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## Good Work Requires A Good Bench.



ONLY  
**\$61.92**  
30" x 5 Ft.

### LAMINATED MAPLE TOP

Solid, quiet, non-skid and non-conductive.

### ELECTRIC SOCKET

Can be mounted on leg for convenient use of power tools.

Write Today for Our Catalog and the Name of Your Local BAY Distributor

**BAY PRODUCTS INC.**

1827 CAMBRIA ST., PHILA. 32, PA.

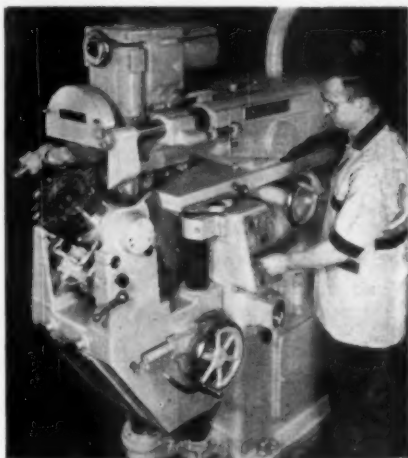
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### Automatic Cutter Grinder

Labor savings in the grinding room and increased production in the machine shop are twin objectives of this automatic cutter grinder. It will do a complete sharpening job on a wide range of milling cutters, since it grinds on the OD as well as the face and bevel of any cutter within its 4-inch to 20-inch diameter capacity.

The machine spin-grinds newly filled cutters to size. A dust collection system is built into the machine and there is positive dirt protection for moving parts. As the grinding wheel wears, the spindle speed automatically increases so that constant surface speed is maintained. The wheel is automatically dressed with every stroke.

The machine was developed specifically for grinding a variety of inserted blade carbide cutters used in general purpose job shop milling. Setups are easily and rapidly changed from one size and type of cutter to another.



Mechanical control of grinding action lengthens cutter life, improves accuracy and finishes, and enables a man to operate more than one machine.

Ingersoll Milling Machine Co., Rockford, Ill.

Use postpaid card. Circle No. 105

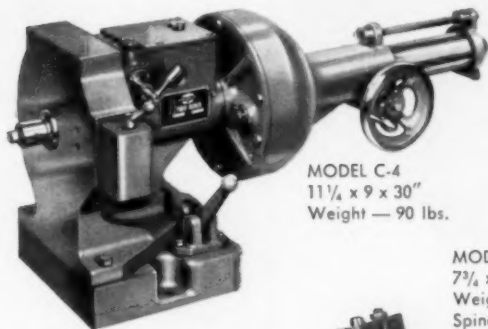


## GREENLEE HYDRO-BORERS

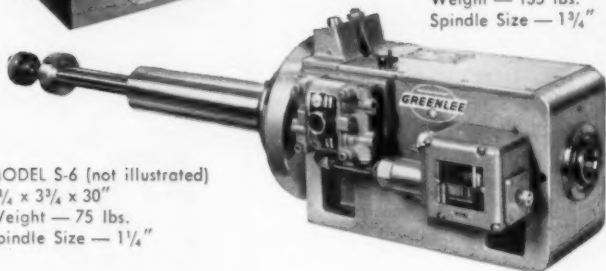
### Low cost precision boring

Patented oil displacement feed principle assures high quality finish. Compact design.

Ideal for mounting in any position on work-holding fixtures, assembly jigs, etc. Simplifies production setups. Three models to meet all your requirements. Write today for further information.



MODEL C-4  
11 1/4 x 9 x 30"  
Weight — 90 lbs.



MODEL S-6 (not illustrated)  
6 3/4 x 3 3/4 x 30"  
Weight — 75 lbs.  
Spindle Size — 1 1/4"

MODEL S-7  
7 3/4 x 5 1/2 x 34 1/2"  
Weight — 135 lbs.  
Spindle Size — 1 3/4"



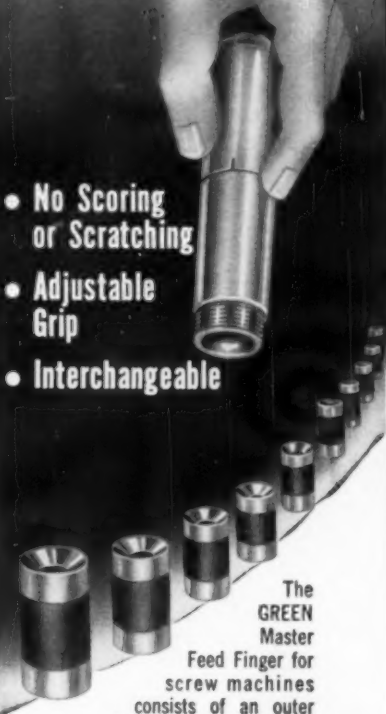
**GREENLEE BROS. & CO.**

1794 MASON AVENUE  
Rockford, Illinois

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# GREEN MASTER FEED FINGERS

- No Scoring or Scratching
- Adjustable Grip
- Interchangeable



The GREEN Master Feed Finger for screw machines consists of an outer sleeve, a compressible rubber insert for gripping the stock, a tension sleeve for compressing the rubber insert, and a combined locking nut and feed tube adapter. Write for FREE Catalog.

## GREEN

MANUFACTURING COMPANY  
122 S. PRAIRIE AVE. • ROCKTON, ILLINOIS

Use postpaid card. Circle No. 373

## Hand Press Features Controlled, Positive Action

A new hand press, HP Jr., features controlled, positive action and is designed for fast, versatile operation in riveting, assembling, forming, stamping, crimping, piercing, and all light press jobs.



Fast, versatile operation in light press jobs.

Stroke is  $\frac{3}{4}$ "; vertical opening, adjustable 1" to  $2\frac{1}{8}$ "; horizontal gap,  $1\frac{1}{2}$ "; spindle hole for punch,  $\frac{3}{8}$ " dia.; die space,  $3\frac{3}{4}$ " x 6"; handle leverage, 7"; bench space including handle,  $10\frac{1}{4}$ " x 10"; over-all height,  $13\frac{1}{2}$ "; net weight, 50 lb.

High Speed Hammer Co., Inc.,  
Rochester 21, N.Y.

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3 lbs.  
4.10

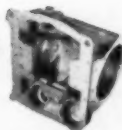
**SAVE TIME and MONEY**  
**101 REPAIRS**  
**Lab-metal**  
Spreads like paste - Hardens in metal  
Metal - Wood - Plaster - Glass - Plastic  
**EASY! FAST! NO MIXING!**

Available at your distributor or write  
ALVIN PRODUCTS, Inc. Worcester 4, Mass.

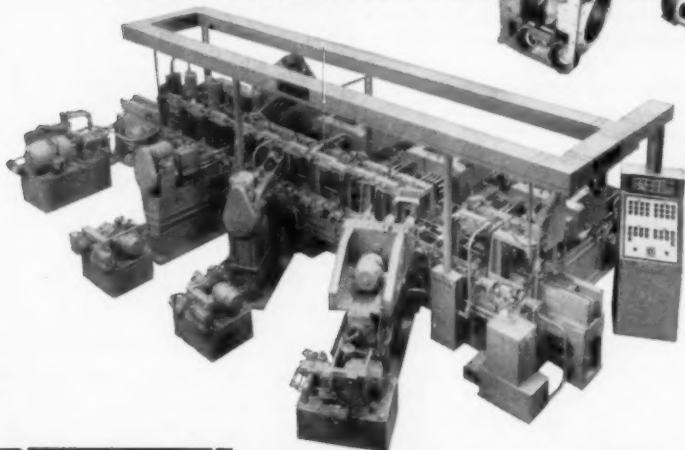
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MACHINE and TOOL BLUE BOOK

CHANGE PRODUCTION from



to



## **BARNESDRILL** units readily re-group or modify for new production needs

Here's how existing machines may be changed to handle new production problems.

- Modify auxiliary heads on existing machines.
- Use existing center section, modify or add new units.
- Adapt new center section, modify and/or add new units.

- Use idle equipment and group around existing or new center section.
- Use existing units, move from facility to facility, and adapt to required production.

Diagram shows Barnesdrill transfer machine as modified, original machine in white, with changes and additions in gray.



Barnesdrill engineers have been building production unit-type machines since 1937. Many of these original machines have been re-grouped or modified several times, effecting tax savings and reducing capital investment requirements. If you have product changes at the present time, or want to change-over to new operations, ask Barnesdrill engineers to show you how existing machines can be effectively utilized, with savings up to 20% over new machinery costs.

### **New Bulletin**

Contains Complete Story On Barnesdrill Units. Write For Free Copy.



## **BARNES DRILL CO.**

852 CHESTNUT STREET • ROCKFORD, ILLINOIS  
DETROIT OFFICE: 13121 Parlane Avenue

Use postpaid card. Circle No. 375

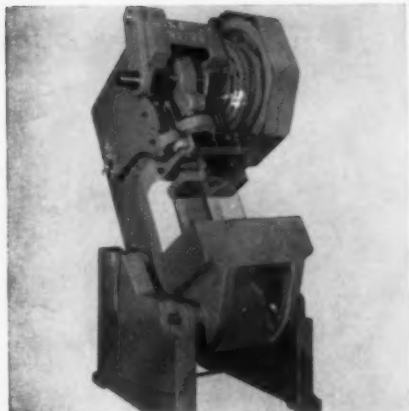
## OBI Presses Improved

Improved design and operating features are offered in Series 1 OBI presses, available in 35, 45, and 60 ton capacities.

Recirculating lubrication system can be furnished as an optional extra. The system continuously lubricates main and connection bearings, gibs, gears and counterbalances. Enclosed within the press frame and protected from damage, it lowers maintenance and cleanup costs and prolongs press life.

A modified flanged slide gives larger die area as a standard. Lower connection ball box adjustment consisting of a threaded take-up nut, adjusted with a spanner wrench, quickly takes up a ball box clearance without the time-consuming task of dismantling the slide.

Presses are equipped with a combination air friction clutch and brake unit which is claimed to provide torque overload control, greater tripping ef-



The 35-ton model. Others 45- and 60-ton capacity. efficiency, and controlled cycling and inching. A centralized press control package is mounted in a cored recess area at the top rear of the press frame.

The Minster Machine Co., Minster, Ohio.

Use postpaid card. Circle No. 109

## choose from 3 KELLER DIE FILER MODELS

Heavy ribbed table tilts 12° four ways. New fast acting chuck makes file changing easy. Generous Oilite bearings, balanced scotch yoke cuts vibration to minimum, two speeds with 1½" stroke and other features make these KELLER DIE FILLERS outstanding machines at low cost.

### ECONOMY MODEL \$109.50

Without overarm. With motor  
STANDARD MODEL F256A same as Economy plus the roller support arm. \$131.50.  
DELUXE MODEL F256B same as Standard plus reciprocating vertical slide. \$149.50.

### Low Cost DRILL PRESS VISE \$11.50

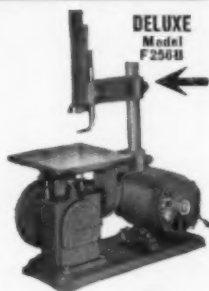
Jaws 4¼" wide, 2" deep, opens to 4¼". Can be quickly set to any angle. Weight 16½ lbs. An outstanding value at this 1956 price.

KELLER DIVISION

*Sales Service Mfg. Co.*

2361 University Ave.

St. Paul 14B, Minnesota

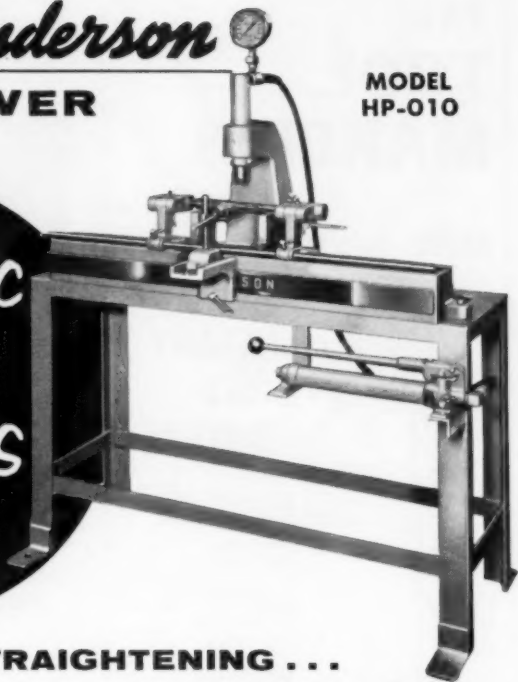


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**ANOTHER** *Anderson*  
**TIME-SAVER**

**MODEL  
HP-010**



**ACCURATE STRAIGHTENING . . .  
AT LOW COST**

The Anderson Hydraulic Hand Press was developed to *reduce costs*. Checking and straightening are accomplished in one position . . . eliminating the time consumed shifting parts back and forth from checking fixtures to straightening anvils. Efficient hand hydraulic pumps power various models of presses ranging in capacity from 10 to 50 tons. Attachments make possible the checking of stepped or odd shaped parts with centers. Different lengths of work can be handled by easy adjustment of rolls and centers. A pressure gauge is standard equipment. A special attachment is an indicator calibrated to thousands of an inch for locating high and low spots on the work, and to indicate how much the shaft is bent under pressure. An Anderson Hydraulic Hand Press can help you solve your straightening problems.



Write for Bulletin No. 4-5  
**ANDERSON BROS. MFG. CO.**  
**ROCKFORD, ILLINOIS**

# The TOOL MAKER'S TOOL— EM 5/8" DRILL PRESS



FLOOR MODEL



BENCH MODEL

features

**INSTANT  
SPEED  
CONTROL**

**BUILT-IN  
GEAR  
DRIVE**

FOR EXTRA  
LOW SPEEDS

**PRECISION  
SPINDLE**

Designed and engineered for tool room and precision use. Accurate mounting of head and column insures squareness of spindle to table. Heavy construction. Convenient direct reading variable spindle speed control.

Write for Literature  
and Prices.

**THE ELECTRO-MECHANO CO.**  
263 E. ERIE STREET MILWAUKEE 2, WIS.

Use postpaid card. Circle No. 378

## Coils of Varied Diameters Made for Tubing & Strips

Model C-1 coiler is designed for making coils of various diameters and pitch for tubing, bar and strip. The radius



A coil in 5/16 stainless tubing being made; smaller diameter coils beside it.

of the coil or circle can be varied by turning the crank at the left of the machine.

The push-button station on front of the machine permits running a straight length followed by a radius as is used in a U-bend, while the reversing switch allows forming either right or left hand coils.

Curvit Corp., Plainville, Mass.

Use postpaid card. Circle No. 108



Use postpaid card. Circle No. 379

MACHINE and TOOL BLUE BOOK

For the Precision  
of a Count-down



## **T-J**

LAUNCHES A NEW  
**CUTTING TOOL LINE**  
FOR MILLING ACCURACY

For precision milling to close tolerances, so vital in today's high-speed, high-production manufacturing, T-J now offers a new, improved line of milling cutters. The new cutter line features a high helix angle, double back-off, and a right-hand spiral to produce more and smoother cuts between grinds, and a free-cutting, stronger tool.

Specially designed and precision-manufactured for die sinking and production milling, the new line is designed to include flats on the shanks for set screw type drivers on all of the end and side milling cutters. Write today for complete information to the Tomkins-Johnson Company, Jackson, Mich.

Ask for completely new  
cutter catalogue No. 259.

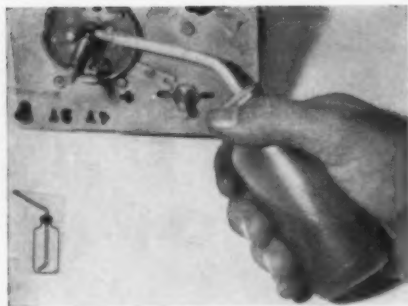


## Spillproof Dispenser

Merely squeezing the plastic container produces either a squirt or a stream of oil (or other liquid). Available in 4 or 8 oz. sizes with straight or angle nozzles, each dispenser has a screw-on cap. Once sealed, the dispenser can be carried anywhere without worry of leakage. The user has visual control of the contents of this breakproof container.

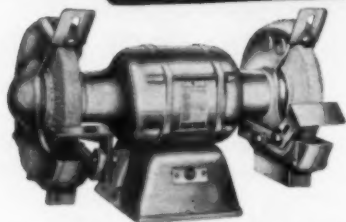
Hunter Tools, P.O. Box 564, Whittier, Calif.

Use postpaid card. Circle No. 107



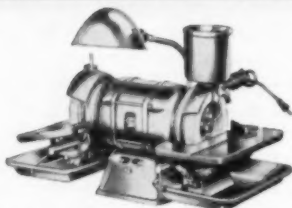
A squeeze gives a squirt or a stream.

## MOST *Value-Packed* GRINDER MADE!



*only* \$110<sup>00</sup>

### CARBIDE TOOL GRINDER



Model 153-6". Reversible  $\frac{1}{2}$  HP motor, 3450 RPM.  $1\frac{1}{2}$ " wide wheels. Every part oversize for rugged, long-lasting use. Just \$189.00.

# BALDOR

## MODEL 153-8"

Feature for feature, no other grinder offers so much for so little. Compare HP rating, wheel size, shaft diameter, bearing size with any other similar-type grinder. You'll quickly see why you get *more* with Baldor!

- Big  $\frac{1}{2}$  HP motor; won't burnout even if repeatedly overloaded!
- Wide-clearance design provides maximum working room!
- Large 8" first grade wheels!
- Heavier  $\frac{3}{4}$ " arbor; larger ball-bearings!
- Dynamically-balanced rotor—extra smooth operation!
- Exhaust-type guards!

Write today for Bulletin 321N on complete line of Baldor Grinders and Buffers!

## BALDOR ELECTRIC CO.

4353 DUNCAN AVE.

ST. LOUIS 10, MO.

Use postpaid card. Circle No. 381

## Feedback Mechanism Gives Operator Complete Control

The H-P-M servo controlled C-press provides absolute control of all press actions without unnecessary and space-taking linkages, the manufacturer



Bed and throat area is completely unobstructed, claims. Slow hand motion results in slow ram movement; fast action produces rapid ram movement.

This press is reported to be suited to straightening operations as the operator has complete control of ram speed, of travel, distance and tonnage imposed on work. This close control over the ram motion is desirable for applications of a research nature where the force of the ram must be accurately evaluated or controlled.

The Hydraulic Press Mfg. Co., A Div. of Koehring Co., Mount Gilead, Ohio.

Use postpaid card. Circle No 110



### TAP BUSHINGS

Drives all standard taps from No. 0 to 1 1/2" and pipe taps from 1/8" to 1". Five o.d. sizes.

LESS TAP BREAKAGE  
LESS TAP WEAR

Write for Bulletin

### BYCO INDUSTRIES

2201 Snelling Ave.,

Minneapolis, Minn.

Use postpaid card. Circle No. 382

April, 1959

## "A.N.D." and "M.S." HYDRAULIC CONTOUR CUTTERS in stock

A.N.D. 10050 internal



Economy series;  
integral plain pilot



Turret lathe and  
drill press series;  
integral carbide  
reamer pilot



Heavy duty series;  
replaceable carbide  
reamer or plain pilot,  
carbide and HSS

MS33656, MS33657,  
MS33514, and  
MS33515 O.D. flat  
form tools



Carbide tipped  
High speed steel

MS33514 internal



Solid carbide, carbide  
tipped, high speed  
steel models

MS16142 internal



S.A.E.

Carbide tipped; plain  
or reamer pilot

Write for sizes and prices.

### SONNET Tool and Mfg. Co.

580 North Prairie Avenue, Hawthorne, California

Use postpaid card. Circle No. 383

229

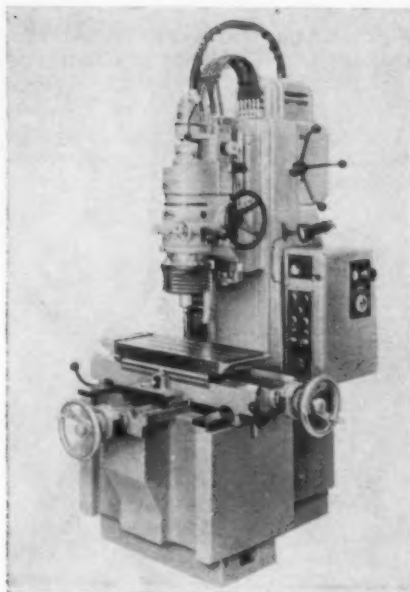
## Jig Grinder Has Large Table 11"x24"x18"

Finer tolerances in the finish-grinding of tools for the missile era are claimed for the No. 3 Moore jig grinder, which offers a greater range and larger table than its No. 2 predecessor—11" x 24" x 18" height. It will grind, with split-tenth accuracy, straight or tapered holes and regular or irregular contours to size and location after hardening, the manufacturer reports, also providing this same efficiency for slot-grinding and chop-grinding operations. Spindle speeds are 40 to 250 rpm.

Accuracy of positioning reported for longitudinal travel: the greatest error in any inch, 30 millionths; in 18", 90 millionths. For the cross travel, the greatest error in any inch, 30 millionths; in 11", 90 millionths.

Moore Special Tool Co., Inc., 800 Union Ave., Bridgeport 7, Conn.

Use postpaid card. Circle No. 111



Spindle speeds are 40 to 250 rpm.

JAM  
PROOF

### AUTOMATIC THRUST ADJUSTMENT

Spring loaded spindle maintains constant tail stock thrust.

### LONGER LIFE

Needle bearing distributes bearing stress over greater surface, thus holding close tolerances for much longer time.

### FASTER SPEEDS

Smaller turning radius gives much higher RPM rate than ordinary live centers.

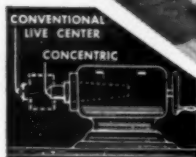
# CONCENTRIC

  
LIVE CENTERS

the original,  
patented  
spring loaded live centers

GREATER LOAD CAPACITY

LESS OVERHANG  
MEANS MORE  
RIGIDITY...  
MORE WORKING  
RANGE



Pat No. 2,520,473

Write  
Today  
for  
Complete  
Information

**CONCENTRIC TOOL CORP., 2486 Huntington Dr., San Marino, Calif.**

Use postpaid card. Circle No. 384

## Two Honing Machine Series Feature Automatic Control

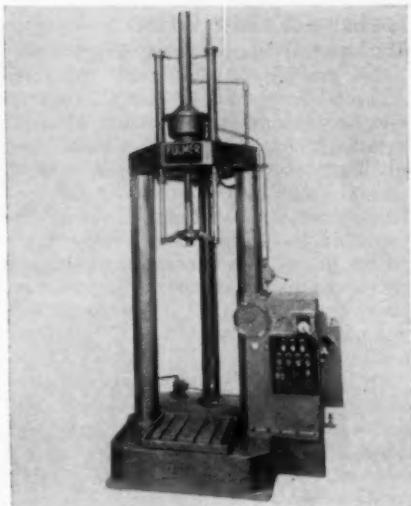
Two additional series of vertical honing machines are of the twin cylinder crosshead type, decreasing the over-all height of the machines. The Model 12 Series is available with up to 60" strokes and up to 25 hp, while the Model 18 Series offers up to 120" strokes and up to 35 hp.

Both series include the Fulmer Ful-feed system for control of honing tools, which has completely automatic and manual remote control of tool expansion and retraction. Featured are automatic fast feed-out, timed spark-out cycle and retraction of the tool.

Control for automatic operation is by cycle timer, or automatic sizer.

The C. Allen Fulmer Co., 105 E. 4th St., Cincinnati, Ohio.

Use postpaid card. Circle No. 112



Remote control of tools—automatic or manual.

# POWER

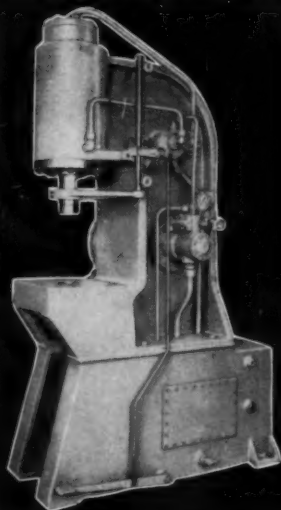
... when you need power!

1½-75 TONS

GREENERD, for 76 years, has manufactured Power-Performing ARBOR and HYDRAULIC PRESSES; maintenance-free; may be furnished to J.I.C. Standards, and designed to handle the following variety of work:

- ASSEMBLING
- BENDING
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- CRIMPING
- EMBOSHING
- FORMING
- MOLDING
- RIVETING
- SIZING
- STAKING
- STRAIGHTENING

Write for Catalogue = 656



*Greenerd* ARBOR PRESS CO.  
41 CROWN ST. NASHUA, N.H.

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## Rotary Table with Unique Measuring System

To provide a stationary platform divorced from Mother Earth's rotation for the calibrating and testing of navigational gyroscopes, such as those used in missile and rocket development, a special tilting rotary table with Electro-limit measuring system has been developed. In effect, this rotary table places the instrument under test, while sitting on earth, in the same environment that would exist if the instrument were resting on a stationary platform out in space.

The bedrock of earth rotates one revolution in 23 hours, 56 minutes, four and nine one-hundredths seconds—the sidereal day. To counteract the earth's rotation, the rotary table is designed to rotate at an angle correlated to a selected star's path and at a rate of speed based on intervals in the sidereal day—in the opposite direction.

Since it is necessary to establish very



Rotary table with Electro-limit measuring system.

accurately the five degree intervals in the sidereal day, and pass this information on to computing equipment that

**NEW** 

### OPTICAL DIVIDING HEAD

AT LAST available again the ORIGINAL 



**WE GUARANTEE EXPERT SERVICE ON ALL CARL ZEISS-JENA INSTRUMENTS AT ALL TIMES**

**GEO. SCHERR CO., Inc.**

**PERMITS PRESETTING TO ANY DESIRED MINUTE AND SECOND FACTOR FOR NEXT OPERATION WHILE FIRST OPERATION IS IN PROGRESS**



does not depend for accuracy on worm, worm gears or index plates. It is a thoroughly practical, rigidly constructed tool.

INDEXING BY A DIVIDED GLASS CIRCLE AND VERNIER, FULLY PROTECTED AND ENCASED, MOUNTED DIRECTLY ON SPINDLE, THUS NO INACCURACY FROM GEARING, WEAR OR PLAY.

BUILT FOR PRODUCTION USE on MILLER and GRINDER

Accuracy  $\pm 5$  Seconds  
Range of Scale: 0 to 360 Degrees

Get the **FULL STORY** of this **OUTSTANDING SHOP and INSPECTION AID**

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200-MT LAFAYETTE STREET • NEW YORK 12, N. Y.

calibrates the gyroscopes, the table is equipped with the high-precision Electrolimit measuring system. A special rim mounted on the 24" standard table face plate is equipped with Electrolimit lugs spaced five degrees apart. As the table rotates, an Electrolimit sensing head picks up the magnetic center of each lug and passes an output signal to the computing equipment, which in

turn sets up the machinery for calibrating the gyroscope.

The plus and minus tolerances for various degree points from 15° to 25,000° per sidereal hour are held to a small fraction of 1%. The tilt of the table is manually set and is not changed during the rotation cycle.

Pratt & Whitney Co., Inc., Charter Oak Blvd., W. Hartford 1, Conn.

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**NEW, LIGHTWEIGHT, POWERFUL**

## **FLEXIBLE TOOL SHAFT**

**Connects To Any Motor**



Stow flexible tool shafts increase precision, eliminate operator fatigue on production grinding, polishing, sanding and other finishing operations in which the operator must hold the tool for long periods of time. Up to 3 HP can be transmitted through these new tool shafts, which consist of a core made of highest grade music wire rotating inside a rubber-covered casing. Each shaft furnished with ball bearing motor connection and high-speed ball bearing handpiece with removable wheel Arbor having  $\frac{1}{2}$ -20" threads. An angle head can be used in place of the handpiece as shown in the photograph.

Four Sizes of these shafts are available . . . models 38, 40, 50 and 63, which come in 6-foot standard lengths. The largest shaft, model 63, will handle 3 HP at speeds up to 6900 RPM and has a maximum capacity for various accessories as follows: grinding wheel, 8" x 1"; buffing wheel, 8" x 1"; sanding disc, 9" diameter; sanding drum, 6" x 2½"; wire brush, 8" x 2"; steel drills, ½" diameter.

**Write for Catalog 57**

**STOW MANUFACTURING CO.**

**30 Shear St.**

**Binghamton, New York**

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## Heavy Duty Reinforced Wheels

Heavy duty wheels, developed for use on band saws and band resaws, feature rims reinforced with a double thickness of quality steel claimed to make them five times stronger. They are reported as ideal for use on resawing operations or on very thick work, on shakes, or any work requiring extreme blade tension. The wheels offer new dynamic

balancing for absolute vibrationless operation, at any high speeds, the manufacturer reports.

Carter Products Co., 50 Market St. N.W., Grand Rapids, Mich.

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## Bearing Aluminum Bars

New bearing aluminum bars can be machined to fit any bearing use. They are formed of Alcoa B-750-T5, an aluminum-tin alloy with certain other



**CUSTOM-MADE  
ROLL DIES**

**ENGINEERED FOR YOUR  
REQUIREMENTS**

Typical NM custom-made roll dies built to accept interchangeable steel inserts that can be changed readily at any time.

Precision-built of the finest tool steels, New Method's custom-made roll dies can be used on any secondary marking machine or special device.

No matter what your particular requirements ... graduated roll dies for marking on ANY SURFACE SHAPE, convex dies for concave surfaces, concave for convex surfaces, trade mark, segment insert, embossing, etc. ... New Method can engineer and

manufacture them to fit your particular needs.

### Other New Method Marking Devices . . .

- ★ A complete line of automatic roll markers for most marking requirements, each designed for a specific need.
- ★ A complete line of manually operated marking devices.



Write today for NEW catalog MA-59

**NEW METHOD STEEL STAMPS, INC.**  
147 JOS. CAMPAU • DETROIT 7, MICHIGAN

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MACHINE and TOOL BLUE BOOK

metals (copper, nickel, magnesium) added.

Good heat conductivity, excellent embedability, good ductility, high load carrying capacity, high resistance to corrosion, conformability to the shaft, and good fatigue strength are qualities which make this bar a satisfactory sleeve bearing material.

Bunting Brass and Bronze Co., Toledo, Ohio.

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## New Sizes of T-Slot Nuts

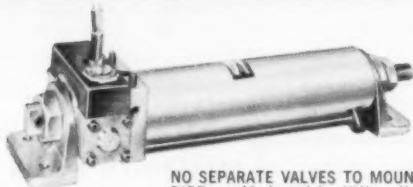
Additional sizes of T-slot nuts have been added to the Northwestern tool line. They are now available for all machine tools with table slots ranging from  $\frac{3}{8}$ " wide up to and including 1-1/16" wide in multiples of 1/16".

The nuts are machined from bar stock for safe and solid clamping. They are heat treated for long life and black penetrated to prevent rust. Selection chart shows the correct size T-slot nuts

*Modernair*

## VIH (VALVE-IN-HEAD) CYLINDERS

**Save Space, Weight & Piping**



NO SEPARATE VALVES TO MOUNT OR PIPE... Modernair's VIH cylinders have directional and exhaust speed control valves built in!

### FEATURES:

- \*COMPACT CYLINDER-VALVE "PACKAGE" includes built-in directional control, exhaust speed control valves.
- \*SOLENOID, BUTTON BLEEDER or PILOT PRESSURE valve operation.
- \*INTERCHANGEABLE MOUNTINGS.

### BRIEF SPECIFICATIONS:

DIAMETERS: 1 1/2", 2", 3"      ROD SIZES: 1/2", 5/8", 3/4"  
MIN. OPERATING PRESSURE: 20 p.s.i.  
MAX. OPERATING PRESSURE: 150 p.s.i. (solenoid)  
200 p.s.i. (bleeder or pilot pres.)

Write for catalog, prices today—or phone your local MODERNAIR distributor (listed on your phone book Yellow Pages).

*Modernair* CORPORATION

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For table slots from  $\frac{3}{8}$ " to 1-1/16" wide.

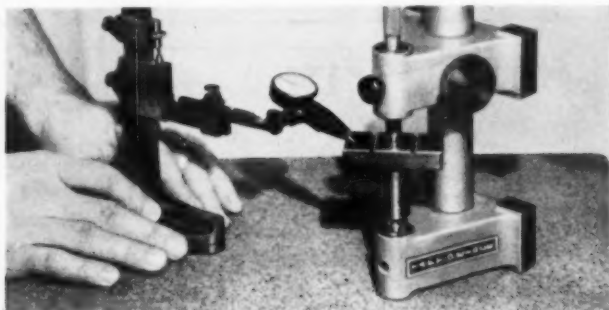
for all machine tools and metalworking equipment.

Northwestern Tools, Inc., 118 Hollier Ave., Dayton 3, Ohio.

Use postpaid card. Circle No. 116

### Attachments for Pipe, Bar, Angle Iron Bender

Two attachments for the Hossfeld universal pipe, bar and angle iron bender are available. Handrail capping can be bent into lamb's tongues, edgebends with the No. 2 bender and dies. Single



To indicate face runout, stand the Instrument Bench Centers vertically on precision ground headstock pads.

### New! Instrument Bench Centers Speed Inspection of Miniature Parts



No. 9205M Instrument Bench Centers checking miniature crankshaft for concentricity after O.D. grinding operation.



Complete Line of Bench Centers

The Taft-Peirce Standard Bench Center Line includes models with work capacities from 8" dia. x 18" to 10" dia. x 60". Special sizes designed and built to order.

These new Taft-Peirce No. 9205M Instrument Bench Centers are specifically designed for speed, accuracy, and versatility in checking miniature and sub-miniature parts.

When placed horizontally on a surface plate of known flatness, the centers line up automatically within close limits, and a quick turn of a knurled knob locks them in position. The entire unit may then be turned up on end to check runout and squareness of shoulders and sides of grooves.

An exclusive feature is an adjustable headstock center point that may be rotated to bring the work centers perfectly parallel to the surface plate. This allows the inspector to obtain a precise reading of concentricity and parallelism in a horizontal plane, and shoulder runout in a vertical plane.

Maximum capacity—8" long x 3" diameter. Send for new catalog No. 511 showing all Taft-Peirce precision tools.

TAKE IT TO

TAFT-PEIRCE



WOONSOCKET, RHODE ISLAND

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MACHINE and TOOL BLUE BOOK



Combination lamb's tongue and edge-bend being formed on No. 2 iron bender.

and double turn scrolls can be formed in seconds. The handrail capping and scroll dies make bender more versatile. For hard-to-pull bends on heavier material a hydraulic attachment is available. Hossfeld Mfg. Co., Winona, Minn.

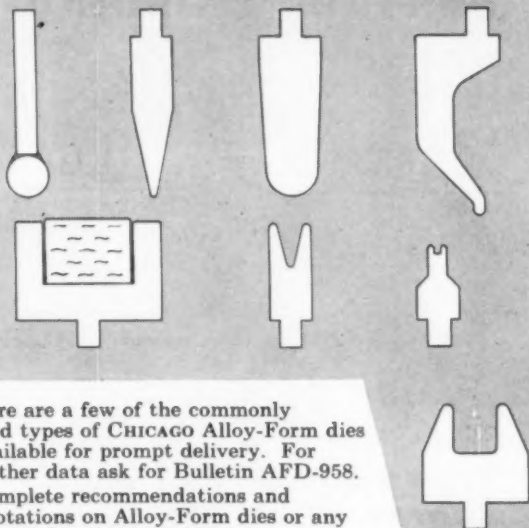
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### Standard Subland Drills

Mohawk Tools, Inc., Montpelier, Ohio, has announced the immediate availability of Subland drills in all practical standard sizes for drilling and chamfer-

Alloy Forming for  
AIRCRAFT  
MISSILES  
ROCKETS  
and  
OTHER FABRICATIONS

**CHICAGO**  
**ALLOY-FORM DIES**  
*For All Makes of Press Brakes*



Here are a few of the commonly used types of CHICAGO Alloy-Form dies available for prompt delivery. For further data ask for Bulletin AFD-958. Complete recommendations and quotations on Alloy-Form dies or any special die upon request.



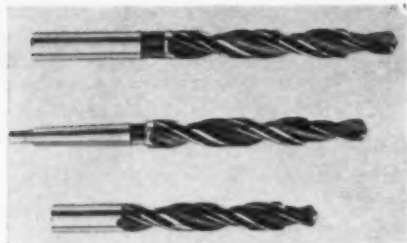
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8741

Press Brakes • Press Brake Dies • Straight-Side-Type Presses  
Hand and Power Bending Brakes • Special Metal-Forming Machines

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Three step lengths and three shank styles.

ing operation prior to tapping: tap sizes from 10-24 to  $\frac{5}{8}$ -18 NC and NF, in three step lengths and three shank styles.

Drill sizes were selected for industry-wide acceptance of unified standards and hole tolerances and to provide a faster, more accurate method of simultaneously drilling and chamfering clean, concentric holes for better tapping—plus a saving in tap costs.

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# SAVE 50% or more in CONTOUR GRINDING COSTS with Micromaster



Sold by  
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Visual Grind is manufactured by  
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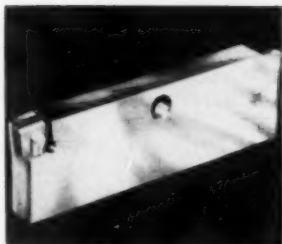


## Throwaway Insert Cutter Blocks

The advantages of throwaway carbide tooling now have been applied to block-type boring tools: (1) elimination of carbide grinding, (2) instant tip indexing, (3) lower cost per cutting edge, (4) lower tool inventory. Blocks are available in two-cutter and single-cutter styles; cover a bore range of 2½"-17"; can rough-bore to .004".

Davis Boring Tool Division, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

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Bores 2½"-17"; rough-bores to .004".

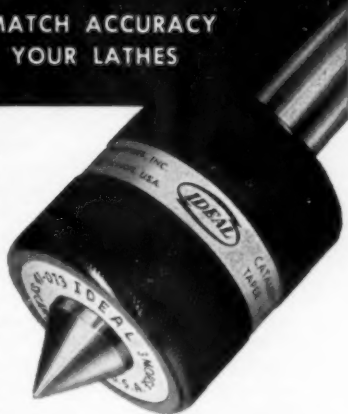
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Ideal's GOLD BAND Live Centers offer savings, simplified operations and higher lathe output both in quantity and quality. Contact your distributor today!



A COMPLETE LINE FOR EVERY  
NEED—SPECIALS TOO!



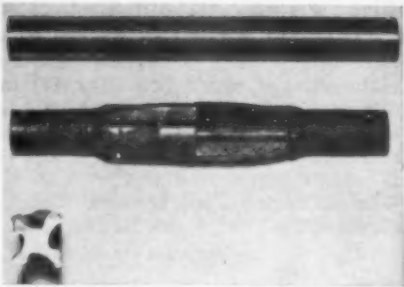
**IDEAL INDUSTRIES, Inc.**  
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Sycamore, Illinois

*Write for*  
Complete catalog data  
and specifications.

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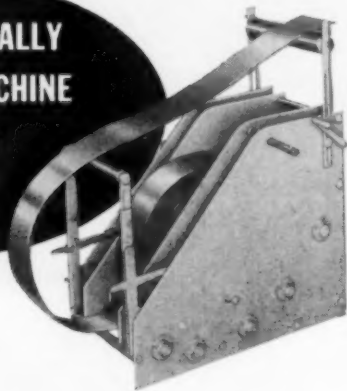
## **Taps 1/2" to 2" Forged on Tap Forging Machine**

A precision tap forging machine, manufactured by an Austrian concern, is made available to the American market by Girard Associates. By this method for precision forging of taps, one operator can forge taps from precut bar stock, two at a time, in 15 to 20 seconds per pair for taps 1/2" to 2", the manufacturer claims. Flutes are reported to be forged with a tolerance



**AUTOMATICALLY  
FEED ANY MACHINE  
FROM THIS  
SLACK LOOP**

**for greater  
accuracy  
and production!**



Koil Kradles form a slack loop between coil and machine from which any automatic feed can freely draw! The slack loop eliminates drag and resistance of pulling against heavy coils. Reduced drag improves accuracy of any feed device... records show up to 80% more footage handled per shift!

Koil Kradle's variable timer delays shut-off up to 10 seconds after motor switch trips off... forms a new slack loop before stopping, eliminates many unnecessary motor starts and stops! Adjustable plates center various coil widths; reversible motor for rewinding; power driven rolls; anti-friction bearings and numerous other features!

**ASK FOR CIRCULARS**, sizes and prices. Stock widths up to 50", coil weights to 20,000 lbs.

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World's largest  
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of  $\pm 0.004$ " on all dimensions.

Savings are said to range from 200 to 300 lb. per hour for 1" taps, and from 450 to 675 lb. per hour for 1½" taps.

Girard Associates, Chambersburg, Pa.

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### Inspection Instrument For Surface Plates

Tol-Check is a new instrument for checking the tolerance accuracy of any

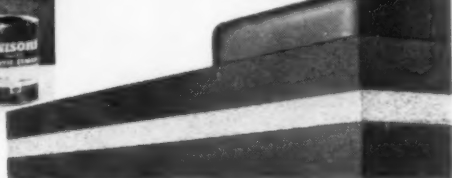


Accurate evaluations in 30 seconds without graphs

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**WITHOUT  
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Whether installing one machine or a whole plant, users report that Unisorb Pads make the job go "slick as a whistle." Here's why:

- Pads are cut to size, buttered with Unisorb Cement, spotted under legs and machine set immediately in place.
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#### **RESULTS...**

- Installation costs and time are drastically reduced.
- Absorbs up to 85% of transmitted vibration. Cuts noise, reduces maintenance and improves working conditions.
- Machines can be quickly and easily moved at any time.

Ask about Unisorb Mounting Pads with engineered density and thickness for every type machine. Send for special trial offer, NOW.

# UNISORB

Division of The FELTERS Company

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203 South St.  
Boston 11  
Mass.

type or make of surface plate. Its function is to determine whether a surface plate is within the prescribed limitations of accuracy. It does this by visually indicating on a dial any over-all tolerance deviations. Accurate evaluations can be made in 30 seconds, eliminating the need for complicated graphs and paper work.

The instrument is supplied with a master surface plate for standard of calibration, durable instrument case

and a protective surface plate cover. The unit can also be supplied mounted on a rolling stand for routine plant inspection programs.

Herman Stone Co., 1860 N. Gettysburg Ave., Dayton 27, Ohio.

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### Locating Pins in 368 Sizes

A new line of locating pins available in two styles is said to feature the largest range of sizes in the industry. They are made in diamond and round

## The S-22 MICROFINISH COMPARATOR



### GAGE SURFACE FINISH TO NEW

#### A.S.A. STANDARDS - *Quickly - Accurately*

This convenient pocket comparator has 22 precision surfaces for specifying and controlling finish to the new A.S.A. Standard B46.1 - 1955. Electroformed in durable corrosion-resistant nickel, the S-22 Comparator provides every department with the most inexpensive method for uniform, accurate control of finish characteristics.

Save valuable time in engineering, inspection, quality control — eliminate costly overfinishing in purchasing and production. \$17.50 complete with leather case.

Available from leading industrial distributors, or write

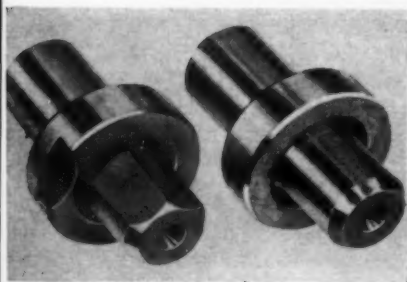


**FAIRFIELD DEVELOPMENT LAB., INC.**

(SUCCESSOR TO BAPTIST MACHINE CO.)

38 Ludlow Street, Stamford, Conn.

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Locating pins are made in diamond, round styles.

styles for locating and are designed with a resting shoulder to act as rest pads. The pins are available in 368 sizes, ranging from  $\frac{1}{8}$ " to  $1\frac{1}{2}$ " head diameters. They are used in bushing applications; also press fitted with lock screw holder.

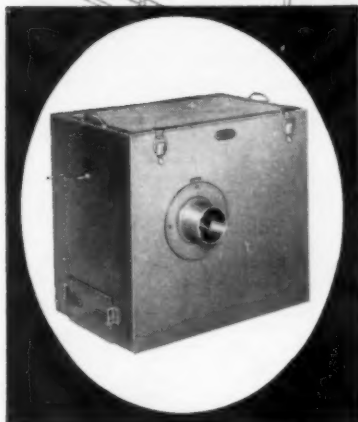
Concentricity is held within .0002 throughout. Both styles are carburized, hardened to Rockwell 60-62 for tough wearing surface with core left mild.

Jergens Tool Specialty Co., 712 East 163rd St., Cleveland 10, Ohio.

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Designed to collect dust from  
single machines



portable —  
easily installed

**DUSTKOP  
STOPS DUST**



Self-contained Dustkop models, like the "520," are practical and effective in collecting dust from single machines. They're designed specifically for service with surface grinders, tool and cutter grinders, offhand

grinders, buffers and other small wheel equipment. These units are also easy to install — are actually portable — and very economical to operate.

Write for illustrated literature

46 models to choose from!

**NEW DUSTKOP AUTO SHAKER**  
shakes filters **AUTOMATICALLY**

**AGET** manufacturing company

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details

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75 TYPES  
AND SIZES

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SPEED REDUCERS



Compact, economical, trouble-free Abart power packages fill any speed reduction need. Any desired shaft arrangement—worm, spur or combination models—fractional to over 400 hp. ratings—single or double reduction—ratios to 10,000 to 1.

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- All Capacities

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man should have this valua-  
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Wedin stock lead screws, with precision ground threads, cover pitches from four to ten in 3/4" up to 1 1/2" diameter. Length varies in 6" increments from 18" to 72". Each end of the screws has sufficient stock length for final turning of plain diameters, etc., to meet most conditions.

In addition to the stock screws, matching nuts are available both in the pillow type and cylindrical design. These lead screw assemblies can be selected in the design of new equipment as well as for replacements of screws in used machinery maintenance.

Because of quantity production of these stock screws, there is cost saving, and down time on machines with defective screws can be cut to a minimum.

Wedin Corp., 403 N. Lake St., Cadillac, Mich.

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Model  
No. 4



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- Uniform Depth

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MACHINE and TOOL BLUE BOOK

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### Floor Model Furnaces

Built in 28 Standard Sizes

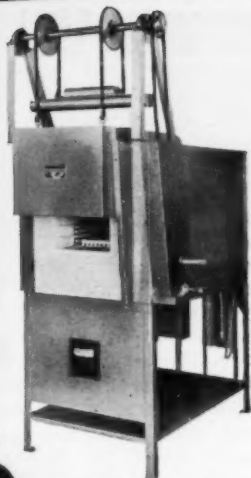
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Model No. 16 Illustrated

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12" W. x 8" H. x 18" D.  
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Cat. #40 SF  
IN HARDWOOD CASE

**A RIGHT HAND TOOL**  
Release Button for Movable  
anvil on right hand side enables  
operator to hold tool the con-  
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Resetting to Zero in Seconds.  
Quick Adjustable Tolerance Hands.  
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Measuring Anvils. STAINLESS STEEL, one-piece spindle and screw,  
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Reading .000050" from dial. Directly reading in  
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Dull chrome finished.

### USE IT AS A COMPARATOR

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Instant Zero adjustment of Indicator.

**FEATURING . . .** Adjustable Measuring Pressure  
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assuring absolute parallelism of anvils.

Eleven Types of INTERCHANGEABLE  
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OVALNESS — TAPERED CONDITION IN 1/10,000"  
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**3 TOOLS IN ONE ★ COMPARATOR**  
★ Master MICROMETER ★ "GO" &  
★ "NO GO" GAGE — 1" Range in .0001"

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INDICATING BENCH  
MICROMETER with  
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Spindle

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**SUPER  
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MEASURING  
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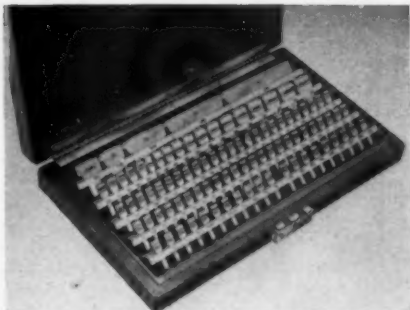
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## Rectangular Steel Gage Blocks

Rectangular steel blocks formerly classified by Webber Gage Co. as Grade A, with accuracies of  $+.000004$ " and  $-.000002$ " reported, are now called A+ by the manufacturer. The price of an 84-block set (including two .100" wear blocks of Croblox) has been reduced from \$413.00 to \$287.50. According to the company, these new A+ blocks are of inspection quality, yet priced for everyday shop use.

In addition, an entirely new classification of Webber rectangular steel gage blocks has been created, featuring  $\pm .000002$ " accuracies. Known as Grade AA, the new blocks are priced at \$555.00 for an 84-block set. Webber's former Grade B line, with  $+.000006$ " and  $-.000002$ " accuracies, has been discontinued. The manufacturer states that the new Webber classifications have



92-block set in new case.

been called Grades A+ and AA because their accuracies exceed those specified by the U. S. Bureau of Standards for Grade A blocks.

The steel blocks are now packaged in tough plastic chests.

Webber Gage Co., 12912 Triskett Rd., Cleveland 11, Ohio.

Use postpaid card. Circle No. 200



Write for Catalog.

*Fischer*

Send parts for free grooving and production estimate

ESTABLISHED 1900

**FISCHER MACHINE CO.**  
ELEVENTH & WOOD STS. • PHILADELPHIA 7, PA.



## ... OIL GROOVERS

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc. This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

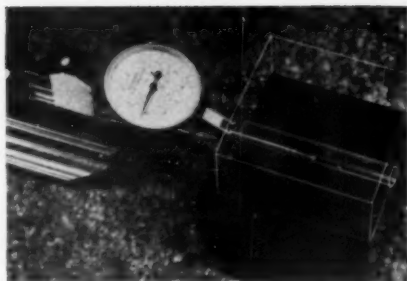
Use postpaid card. Circle No. 404

MACHINE and TOOL BLUE BOOK

## Test Indicators Provide for Deep Hole Work

Four new models, known as Models L-15, L-16, L-19 and L-20, have been added to the recently announced Federal Series L Testmaster line. In addition to providing long range and high magnification, these models are equipped with extra long contacts for deep hole exploration in jig borer and surface plate applications.

The .080" ball tip contacts are either



Long contact test indicator.

## MINIATURE KNU-VISE CLAMPS DO MIGHTY JOBS

These tiny Knu-Vise toggle clamps are capable of exerting 100 to 150 Lbs. clamping force with a reach of 7/8 and 9/16 inch respectively in front of base. Other features are:

- Clamping height, 19/32 above base.
- Double shear bearing pins prevent clamping spindle side-thrust or tilt.
- Largest diameter pins for size of clamp—80% minimum bearing area.
- When open, spindle head withdraws beyond front of base, permits vertical removal of largest parts.
- All models have replaceable grips.



Four Models  
H-100 Twin-flange base



HL-100 Left-flange base



HR-100 Right-flange base



SH-100 Straight base  
for side mounting.

All shown 1/2  
actual size

Write—TODAY, to Dept. A—for complete information.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

**KNU-VISE  
PRODUCTS**

**LAPEER MANUFACTURING CO.**

3052 DAVISON ROAD  
LAPEER, MICHIGAN

WESTERN DIV.: PECK and LEWIS CORPORATION  
4438 Long Beach Ave., Los Angeles 58, Calif., ADams 3-7146  
CANADIAN DIV.: HIGGINSON EQUIP. SALES LTD.  
1131 Pettit Road, Burlington, Ontario

Use postpaid card. Circle No. 405

1.446" or 1.497" long, depending on the model. All are graduated in .0005", have a total range of .080" (eight revolutions) and are available in either horizontal or perpendicular styles with either regular or large (1½" dia.) dials.

For more positive holding, these units are equipped with integral dovetails, rather than an end-mounted holding bar.

Federal Products Corp., 1144 Eddy St., Providence 1, R.I.

Use postpaid card. Circle No. 126

## Surface Finish Tester

Talysurf Model 100 is a portable, universal instrument, semi-automatic in its operation yet suited to a wide range of production inspection applications in the precision testing of surface finish. Work table, pick-up, stylus and support are combined with motorized drive in one solid assembly which can carry small work in universal work-holding fixtures or be fitted with quick loading production tooling.

## NEW FOSTORIA OPTA-VUE\*

MAGNIFIES AND ILLUMINATES FOR  
QUICK, EASY PRECISION SEEING



Other models available for bench or machine mounting. Write for catalog.

A sensational aid for increasing production speed and accuracy. Already in big demand throughout industry for easy viewing of tiniest work details. Many profitable applications for your plant.

\* Trade Mark

Available at Electrical Wholesalers and Scientific Supply Houses

**THE FOSTORIA PRESSED STEEL CORPORATION**  
FOSTORIA, OHIO

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Provides Binocular vision for fine assembly, inspection, testing and all precision visual tasks.

6" x 6" optically ground Lucite lens. 36 sq. in. viewing area, free from distortion.

High light transmission with two 4W fluorescent tube Localite.

Lens and light independently adjustable. Frictional collar disc joints give flexibility for any position.

½" steel tubular stand finished in Hammerine Metallic Silver. Rubber feet. Size 12" x 10" x 9" high.

MODEL D  
**\$40**  
COMPLETE



Instrument easily checks many types of workpieces.

A lever starts the fast testing cycle, which gives in separate meter unit correct unwavering average readings in one stylus traverse. Talysurf Model 100 is claimed to provide the same positive surface finish values in arithmetical average microinches as does the master unit, Talysurf Model 3.

Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill.

Use postpaid card. Circle No. 127

## **FRICION SAWING STEEL, ETC.**

with  
**Tannewitz**  
**HIGH SPEED BAND SAWS**

**IS EXCEEDINGLY FAST,  
SMOOTH, INVOLVES SO  
LITTLE DOWN-DRAW  
THAT FORMED PARTS  
CAN READILY BE CUT  
WITHOUT ANY REST.**



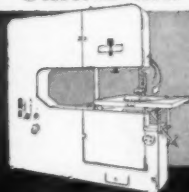
Tremendous time and cost savings, in cutting sheet steel, formed or flat, trimming malleable and steel castings and similar operations, are available to you with these machines.



Get the facts. Ask for **FREE** copy of "FRICION SAWING".

## **The TANNEWITZ WORKS**

**GRAND RAPIDS, MICHIGAN** **GL 6-1729**

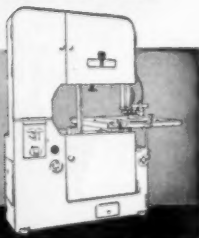


**TANNEWITZ DIE-SAWS**  
**24", 36", 48", 60" CAPACITIES**

**for CONTOUR SAWING, FILING, POLISHING**

*The smoothest, fastest, most trouble-free Die Saws on the market. Write for bulletin.*

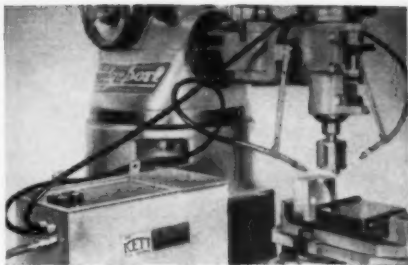
**SAWING MACHINERY SPECIALISTS**



Use postpaid card. Circle No. 407

## Portable Mist Generator

Designed for portability, this lightweight all-in-one mist coolant generator is easily detached and quickly moved from machine to machine. The steel mist nozzle, with its brass outlet, can be flexed in a fixed position to simplify mist applications. Mist can be applied directly to the cutting edges of tools where it is most effective. When chips interfere, mist can be applied from underneath.



Mist cooling from two sides.\*

## In Checking Surface Roughness



In judging microinch roughness by eye or by "feel," sometimes you'll get the right answer, and sometimes not. *You can never be SURE*; for the "confusion factors" are many, and the brain misinterprets what the senses report — the same as with optical illusions.

That's one reason why industry depends on a confusion-proof *shop instrument*—the PROFILOMETER®—when dependable roughness measurements are required.

**FREE BULLETIN LT1** shows why surfaces that look alike, or feel alike, often differ in roughness by several hundred percent. *Write for it!* You'll be interested, and perhaps surprised.



Profilometer is a registered trade-mark.

**MICROMETRICAL  
MANUFACTURING COMPANY**

345 S. MAIN ST.

ANN ARBOR 4, MICHIGAN

Use postpaid card. Circle No. 408

MACHINE and TOOL BLUE BOOK

Coolant generator is offered in a one-gallon size with one or two mist outlets and a four-gallon size with one, two, three or four outlets.

The Kett Tool Co., 5055 Madison Rd., Cincinnati 27, Ohio.

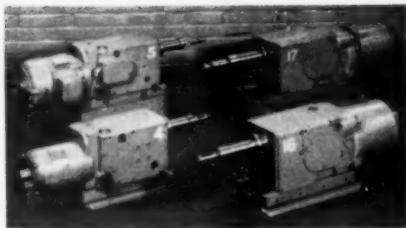
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## Automatic Units Feature Long Strokes, Cam Feeds

Quills are shown fully extended on these automatic units to illustrate available strokes—four inches on the No. 4 and No. 5 units, five inches on the No. 16 and No. 17 units. Models 4 and 16 are drilling units, Models 5 and 17 their companion tapping units.

Each unit has a cam feed for accurate repetition of the work cycle. Follower segments make the stroke of the spindle double that of the feed cam.

Each drilling unit may be converted to its companion tapping unit by using a different feed cam, a reversing motor



Models 4 and 16 are drilling units, 5 and 17 their companion tapping units.

and controls to reverse them. The tapping units can have time cycles as short as 3 seconds.

Kingsbury Machine Tool Corp., Keene, N.H.

Use postpaid card. Circle No. 129

## Precision Surface Grinder

The Blohm hand operated Model 816 hydraulic surface grinder features high precision ball bearing assemblies running in ground and lapped replaceable

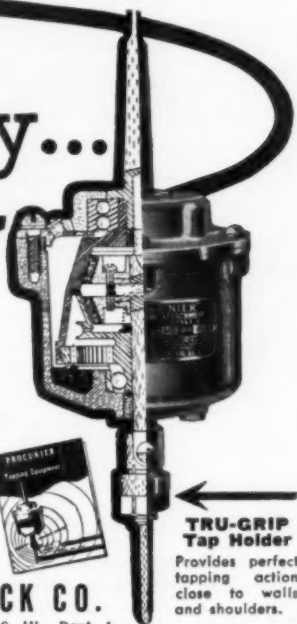
Get the complete, revealing

# Inside Story...

**on the finest tapping heads ever made!**

A complete feature by feature analysis on the amazing Procunier Tapping Line is yours for the asking! Shows the many outstanding construction improvements, mechanical advancements and precision quality operating advantages that make Procunier heads a "must" in production plants everywhere! You'll learn why Procunier means more tapping hours with minimum "downtime," faster production, with fewer broken taps, fewer spoiled pieces and a "new-found" operating ease that helps operators maintain stepped-up production schedules.

Write for **FREE** Brochure giving full details and specifications on the Procunier Line.



**TRU-GRIP Tap Holder**  
Provides perfect tapping action close to walls and shoulders.

# PROCUNIER SAFETY CHUCK CO.

14 S. Clinton St., Chicago 6, Ill., Dept. 4

Use postpaid card. Circle No. 409

# AGMACO

## PRECISION GAGES



We can ship 90% of your gage requirements the same day we receive your order. All gages manufactured to AGD standards from highest quality tool steel. In addition to our standard line we can supply your special requirements within the following ranges:

Plain plugs	.025 to 7.000 ins.
Plain rings	.248 to 3.000 ins.
Thread rings and thread plugs	.030—.125 to 12.000 ins.

Active Grinding & Manufacturing Company offers a complete grinding service backed by skilled men with years of experience solving complex grinding problems. Send us your prints for immediate quotation.

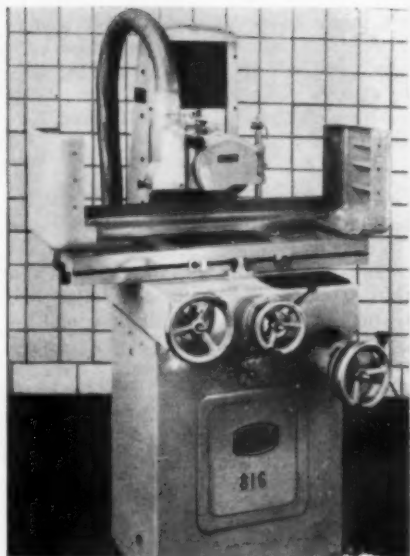
Dealer and Mfg. rep. inquiries invited—Attention dealers: **No Investment** required on our proven sales plan.

**Active Grinding & Mfg. Co.**

Phone: MOntroe 6-8567

2119-21 W. Hubbard St., Chicago 12, Ill.

Use postpaid card. Circle No. 410



**Hand operated hydraulic grinder Model 816.** steel ways for the longitudinal and cross movements of table and carriage; a 2 hp motorized spindle; table cross feed by ratchet lever with travel adjustment for easy and uniform cross movement; fine feed screw on the head elevating wheel with readings of .00004". Capacities are 8" x 16" table surface and 16" under the spindle.

National distributor: Hermes Machine Tool Co., Inc., 48-15 Northern Blvd., Long Island City 1, N.Y.

Use postpaid card. Circle No. 130

## BALANCED ALLOY LEAD HAMMERS



### HANDLES AND MOULDS

1, 1½, 2½ and 5 lb. sizes—order your alloy lead hammer requirements from your mill supply house

or direct from:

**KITZMAN MFG. CO.**

Manufacturers Of Lead Hammer Products

15061 Hartwell Ave. Detroit 27, Mich.

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MACHINE and TOOL BLUE BOOK



## Grinding Head's Radial Feed Adjusted in Action

The Grind-A-Matic is said to assure uninterrupted precision grinding because the radial feed can be adjusted without stopping the machine. The air turbine grinding head can be mounted on a jig borer, boring mill, lathe, milling machine, drill press or other comparable machine tool.



Precision internal grinding head.

*Universal*  
**"FULL-FLO"**  
**COOLANT NOZZLES**  
with **AERATOR**  
Ask for IPB-Sec. 2A Bulletin

Quality... ALL METAL FLEXIBLE HOSE PRODUCTS  
**UNIVERSAL METAL HOSE CO.**  
2153 South Kedzie Avenue, Chicago 23, Illinois

Use postpaid card. Circle No. 412

**BREMIL**  
The **IMPROVED** Compound Lever Shears

**ALL ALLOY**  
**FULLY**  
**GUARANTEED**

**Two Sizes**

**PORTABLE**

No. 1 cuts up to No. 11 gauge strip or sheet.  
No. 2 cuts up to 1/4" steel plate.

**BREMIL MFG. CO.**  
1020 Holland Street, Erie, Penna.

Use postpaid card. Circle No. 413

April, 1959

Fine adjustment can be made accurately on close tolerance work. Fine radial adjustments can be made in increments of .0002" over a range of "0" to .70" diameter by means of a graduated collar which is spring loaded to eliminate backlash. Coarse adjustment from "0" through 1 1/4" grinding radius is made while the spindle is stationary.

Threadwell Tap & Die Co., Springfield, Mass.

Use postpaid card. Circle No. 131

## JIG BORING

to your specification

At your disposal: Our sub-contract jig boring department, one of the best equipped in the East.

**A. K. TOOL CO., INC.**

Route 22, Mountainside, N. J.  
Telephone ADams 2-7300

Use postpaid card. Circle No. 414

save **20 to 30%** on new  
**CARBIDE TOOLS**

RICO has a complete line of:

- Quality rotary carbide & HSS tools
- Available for immediate delivery
- Big savings on new tool costs
- Up to 50% savings on regrinds
- Special tools to specifications
- Distributor inquiries invited about better profit margins with RICO TOOLS.

Attach ad to your letterhead for more information.



**RICO TOOL CO.**

5915 DIXIE HWY. • SAGINAW, MICH.

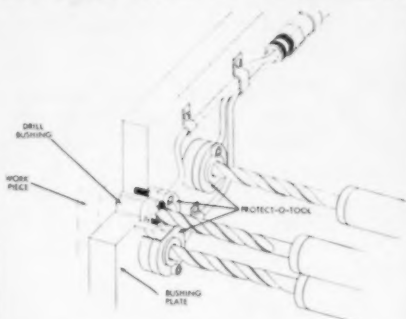
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## Tool Detector Prevents Tool Damage, Scrap

For transfer-type production machines, a new tool detector eliminates separate probe and inspection heads and stations, prevents processing of scrap parts and, by signalling the control panel and shutting down the machine when one tool breaks, prevents additional tool damage.

The Protect-O-Tool is an electronic mechanism that "senses" the presence or

absence of a tool—or even a part of a tool in cases where a small piece of a drill or tap breaks off and remains in



Protect-O-Tool detects broken or missing tools.

the workpiece. The device is mounted on bushing plates behind the regular drill bushing hole.

The Cross Co., P.O. Box 3835, Detroit 5, Mich.

Use postpaid card. Circle No. 132

## WILSON AIR COLLET CLOSER



### STEP UP PRODUCTION 20% +

... for most lathes to 1" bar stock capacity

- Hold delicate parts without damage or adjustment
- Iron grip for heavy work
- No adjusting for stock or part variations
- Finger-tip or foot control eliminates operator fatigue
- Eliminates jarring of head stock

(Ten day FREE TRIAL to reliable firms)

**WILSON AIR COLLET CLOSER, INC.**  
909 40th Ave. NE, Minneapolis 21, Minn.

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## HOLES



HIGH-PRODUCTION

CLOSE TOLERANCE IN ONE PASS

**Clark** "HOLE MILLS"  
P. O. BOX 990 BEVERLY HILLS, CALIF.

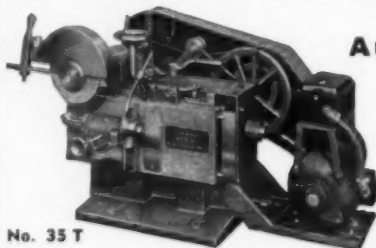
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## SHARPENS SAWS Automatically, in Gangs

Just think of it! 100 26 gauge saws sharpened at one time. Takes saws up to 5½" dia. and 1¾" thick. Saws are automatically indexed and sharpened within a variation of plus or minus .001 of exact diameter of entire lot.

WRITE FOR CIRCULAR 35T

**The WARDWELL MFG. CO.**  
3807 Ridge Rd. Cleveland, O.



No. 35 T

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## Plastic Steel®

Makes Jigs, Fixtures, Metal-Forming Dies, Plastic and Rubber Molds, Foundry Patterns . . . repairs broken or worn machinery. Find out how PLASTIC STEEL and other Devcon products can save time, cut maintenance costs and speed production in your plant — write for FREE Bulletin.

**DEVCON CORPORATION**

501 ENDICOTT STREET, DANVERS, MASS.

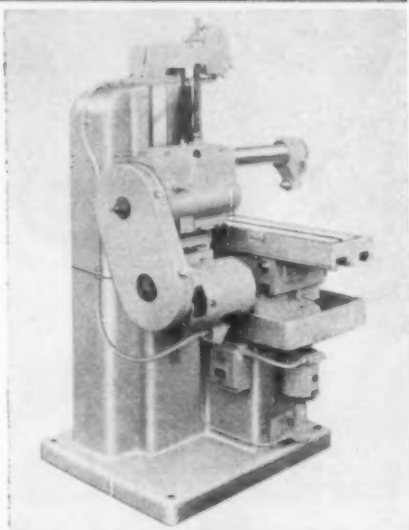
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### Bed Type Milling Machines Provide Wide Tables

Available in three standard arrangements to suit special needs, each of the models of the Producto No. 1 bed type milling machine has lever feed for rise and fall of lever head, micrometer cross adjustment of saddle, and push-pull selector switch and starter. Also featured are a 1 hp geared head motor and six spindle speeds in two ranges (111 to 1105 rpm or 247 to 2463 rpm). Unusually wide tables facilitate mounting of large fixtures.

Table work surface 9-13/16" x 27", lever feed, 10" stroke are provided by Model 1A. Model 1B offers choice of two tables (9-13/16" x 27", 10" stroke, hydraulic lever control for rapid approach, feed and return; 9-13/16" x 32", 15" stroke, electrical push-button control). Model 1C provides 9-13/16" x 32" table surface, 15" stroke.

The Producto Machine Co., 990 Housatonic Ave., Bridgeport 1, Conn.



6 spindle speeds—111-1105 rpm or 247-2463 rpm.

Use postpaid card. Circle No. 133



**DYKEM  
STEEL BLUE®**

**Stops Losses**

making Dies and  
Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead  
**THE DYKEM COMPANY**  
2301G North 11th St. • St. Louis 6, Mo.

Use postpaid card. Circle No. 419

**New "Series 333" Drills  
for Drilling Cast Iron!**



*Special  
Carbide Tip*

*Slow Spiral  
Heavy Web  
Heavy Land*

# ACE

## CARBIDE DRILLS

Whatever your carbide drill requirements may be . . . whether solid carbide or carbide tipped . . . it always pays to make sure you use an "ACE". Their "ground-from-the-solid", highly polished flutes have keener, stronger cutting edges. And that means finer accuracy, longer tool life, and lower drilling costs for you!

Call your local Ace Drill Distributor today!



## ACE DRILL

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

Use postpaid card. Circle No. 420

256

### Drill Head Features 2-Bolt Spindle Arm Mounting

A multi-spindle drill head of the universal joint adjustable type, the Cleveland Pneumatic/Johnson, converts any single-spindle drilling machine for profitable single-pass, multi-hole work. It can be used for drilling, tapping, reaming, countersinking and counterboring—in a circle, straight line or random pattern and to centers as close as 11/16", standard. Minimum close centers of 1/2" are also available.

This attachment is claimed to permit handling a greater range of work with

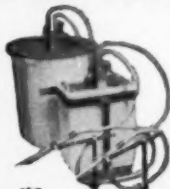


Outer-end Zerk fittings; snap-in universals.

### GRAYMILLS Mist Coolant Systems

**"The Best in Mist"**

Precise air and fluid controls, corrosion proof. Translucent containers let you see the liquid level. Write for new folder.



**GRAYMILLS CORP.**

3721 N. Lincoln Ave.  
CHICAGO 13, ILLINOIS

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MACHINE and TOOL BLUE BOOK

higher precision. Hole pattern changes can be made faster, and maintenance is simplified. Anti-friction bearings are used throughout.

Spindle locating arms are mounted with two precision-milled T-slots on 8" and 10" diameters, providing greater rigidity and maintaining exact settings. Spindle rigidity is reported to be comparable with that of fixed-spindle heads.

To simplify lubrication, Zerk fittings are located on the outer ends of the spindle arms instead of the conven-

tional inner-end position. As a result, they can be reached easier and faster. This design allows lubricating grease to move freely to all needle and ball bearings.

The universal joint components which drive the spindles are hexed at each end so as to snap into engagement without using tools. There are no setscrews or pins to remove.

Cleveland Pneumatic Industries, Inc.,  
64 Old Orchard, Skokie, Ill.

Use postpaid card. Circle No. 134

## USE THIS NEW KIND OF DIAMOND CUT-OFF WHEEL

Gives narrower, smoother cuts on  
industry's toughest materials

...yet prices start at only \$32.25

Now... at *production prices*... DIATRONIC gives you a rim width of .006" that's accurate to a maximum total tolerance of .0005"—or your money back. This accuracy is built in by a new process. No break-in needed. New narrow cut reduces sawdust loss 30%. A must for \$3,000-a-pound silicon or germanium crystal. Cuts tungsten carbide, corundum, aluminum oxide, glass... practically anything. Stock orders shipped in hours; special wheels available. Write for literature, price list.

*Another invention marketed by*  
**NAVAN PRODUCTS, INC.**

Subsidiary of North American Aviation, Inc.

Dept. BB-131, International Airport, Los Angeles 45, Cal.



**DIATRONIC\* DIAMOND WHEELS**

"with built-in tolerance"

\*TRADEMARK

Use postpaid card. Circle No. 422

## Air Line Regulator Features Pressure Valve

Relieving-type air line regulator has a built-in pressure relief valve which allows increases in downstream pressure to bleed harmlessly into the atmosphere when such pressure exceeds the regulator setting. Adjusting the regulator knob to the desired pressure setting is all that is required.

It is not necessary to remove the regulator from the air line for main-

**SPECIFY**

**STANDARD**

**WOODRUFF KEYS**

ALSO FOR

- TAPER PINS
- MACHINE KEYS
- MACHINE RACKS



**STANDARD WOODRUFF KEYS** are STANDARD in many plants including the large automotive manufacturers. Why? Because **STANDARD KEYS** are precision made and tested before shipment. Available in all standard sizes for prompt shipment. Sizes range from  $\frac{1}{8}$ " x  $\frac{1}{16}$ " to  $3\frac{1}{2}$ " x  $\frac{3}{4}$ ". Specify **STANDARD Woodruff Keys** and other **STANDARD** products.

**WRITE TODAY FOR CATALOG**

**STANDARD STEEL SPECIALTY CO.**  
**BEAVER FALLS • PENNSYLVANIA**  
 Plants: Beaver Falls, Pa.; Hammond, Ind.

Use postpaid card. Circle No. 423



Model BRG-250; gauge and wall bracket optional.

tenance. The replaceable poppet valve stem may be quickly removed and a new assembly inserted without disturbing the air line.

Regulator will reduce primary line operating pressures of up to 250 psi and will maintain desired downstream pressures of 0 to 50 psi, 0 to 125 psi, 0 to 250 psi, obtainable from separate units. The  $\frac{1}{4}$ " and the  $\frac{3}{8}$ " models are available for immediate delivery. Other sizes will be announced.

The Bellows Co., Akron 9, Ohio.

Use postpaid card. Circle No. 135

## Heat Treating Furnaces

Two new electric heat treating furnaces for quantity production have a temperature range of 300°F to 2000°F.

**Universal Vernier Calipers**

WITH QUICK THUMB LOCK \$13.90

WITH FINE ADJUSTMENT (as shown) \$16.00

- HARDENED STAINLESS STEEL
- Vernier and recessed scale
- SATIN CHROME PLATED
- FORM-FITTING CASE INCLUDED

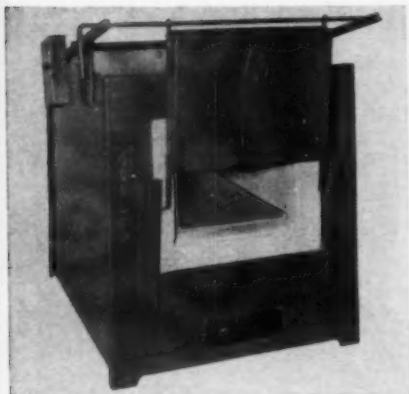
DEPTH

**UNITED INSTRUMENT CO.** 851 E. 8 MILE ROAD • FERRDALE 20, MICH • LINCOLN 5 3304



Use postpaid card. Circle No. 424





Vertically operated plug-type door closes securely.

Chamber dimensions are 10"x7"x18" and 8"x6"x14". The furnaces feature multi-slab type of insulation, with heavy sheet steel body and cast iron end frames.

Embedded heating elements are claimed to give maximum heating efficiency and protection against chemical attacks and other physical damages. Hearth plate is made of cast nickel chromium. A vertically operated counterweighted plug-type door closes securely with brick to brick contact, may be opened to any position.

Cooley Electric Mfg. Corp., Dept. E3, 38 S. Shelby St., Indianapolis 7, Ind.

Use postpaid card. Circle No. 136

**NEW**  
**Spra-Kool**  
**MIDGET**

A Complete Simplified  
**MIST-COOLANT  
GENERATOR**

- Performance Guaranteed Equal to More Expensive Units
- Eliminates Cost of Expensive Settling Tanks, Special Containers, Stands
- Simple, Flexible, Easy to Use

**ONLY \$995 Complete**

For Grinding, Drilling, Milling, Sawing

New Spra-Kool Midget consists of pencil-size brass spray nozzle, durable synthetic plastic tubing, adjustable ball check fitting, removable strainer in suction tube, spring wire attaching clip. Comes packed in mailing container, ready for attaching to airline. Suitable to any type of soluble coolant or oil. Order sample today.

**BAR PRODUCTS CO.**  
4803 White Oaks Ave. • Rockford, Ill.

Use postpaid card. Circle No. 425

**H O L E S**

DOES JOBS NO DRILL CAN DO

**Clark** "HOLE MAKER"  
P. O. BOX 990 BEVERLY HILLS, CALIF.

Use postpaid card. Circle No. 426



**MUMMERT-DIXON CO. 122 Philadelphia St., Hanover, Pa.**

**MUMMERT-DIXON  
FACING HEADS  
with Automatic Feed**

One-way Tool Feed—8, 9 and 12" sizes.

Two-way Tool Feed—9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes. Save many costly set-ups.

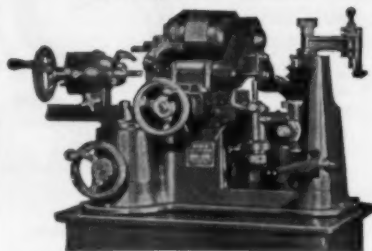
Bulletin No. 4141 Gives Full Details

Use postpaid card. Circle No. 427



## HYBCO TAP GRINDER

Sharpens Chamfers, Flutes  
and Spiral Points



Model 1100

- Capacities No. 0 Machine Screw to  
1½" Hand Taps

**HENRY P. BOGGIS & CO.**  
710 E. 163rd St. Cleveland 10, Ohio

Use postpaid card. Circle No. 428

## PRECISION INDEXING



TO 0.001"

with GEM-17 DIAL INDEX TABLE

True geneva motion gives positive lock, speeds to ¼ sec. Rugged 1000 lb. fixture load capacity with solid anvil capacity of 30 tons. Standard 17" dia. (plates to 36" available). Gray's engineering staff will adapt tables to your work problems.

Send for Bulletin DI-17 and full information.



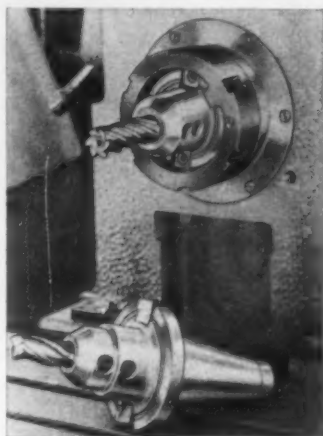
**GRAY EQUIPMENT CO.**

13600 FORD ROAD  
DEARBORN, MICHIGAN

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## End Mill Holders

New type end mill holders may be used in all horizontal and vertical milling machines with No. 50 national



standard taper spindles having Cincinnati Arbor-Loc feature. They serve double or single end mills with shanks from ¾" to 1¼", inclusive. Changing the holder is a simple operation, yet it holds the end mill securely.

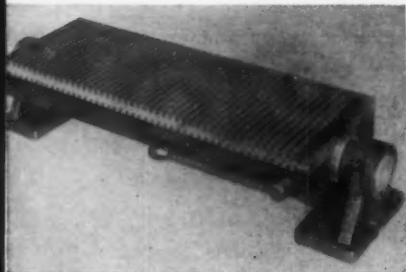
The Weldon Tool Co., 3000 Woodhill Rd., Cleveland, Ohio.

Use postpaid card. Circle No. 137

## Chucks Have Swivel Bases

Swivel bases are an important new design feature of O. S. Walker permanent magnetic chucks, increasing the usefulness of this holding device for all kinds of flat or angular machining operations. Chuck and workpiece may now be tilted to 45 degrees right or left of center. Exact position is set directly from an integral graduated dial.

As in other Walker permanent chucks, the new swivel units incorporate ceramic magnets. The bar poles, only ¼" wide, give uniform holding over the entire chuck top. Work-holding ability is excellent, even on very thin parts. Secondary external fields are controlled



Complete range of sizes available.

to prevent magnetism from invading the machine table and ways. In the "off" position, the chuck is completely demagnetized.

The model illustrated has 8" x 24" table face. A complete range of sizes is available to suit customer requirements.

O. S. Walker Co., Inc., Worcester, Mass.

Use postpaid card. Circle No. 138

## Production Boosted 25% Using New Cutting Fluid

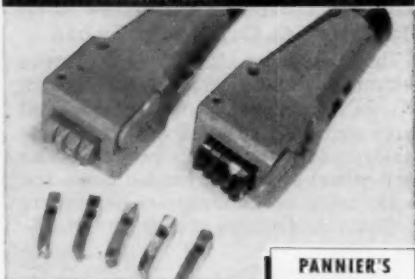
Dromus Oil E, water-soluble cutting fluid for use with throwaway carbide inserts, is said to result in a minimum 25% boost in production rates and costs by permitting a full one-third increase in the work feed rate when the proper cutting speed is selected. When used with an improved metalworking technique the fluid promises new efficiency peaks in the aircraft, missile, automotive and heavy machine industries.

Carbide tools are reported to be protected against breakage resulting from thermal shock. The fluid produces cool chips, permits close dimensional tolerances by reason of reduced workpiece heating, produces a brighter surface finish, and is rust-resistant, the manufacturer claims. It is also said to have possibilities for use with ceramic inserts which presently are worked dry at twice the speed of carbide inserts.

Shell Oil Co., 50 W. 50th St., New York 20, N.Y.

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## ANOTHER PANNIER MASTER MARKER!



New Roto-Pin type lock is integral part of all Pannier Supreme Holders... eliminates loose, bent, dropped, or lost pins... flip it open to change type... flip it back to securely lock type in clear-marking position.

Write for complete data.



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The Linley will meet the most exacting requirements and save you money by releasing your larger borers for heavier jobs. It's a precision tool... versatile and flexible; easy to set up and fast operating. Write to receive complete information on the many improvements that are now standard on this borer.

Table Size: 7" x 17 1/2"  
Table Travel: 6 1/2" x 10"



LINLEY BROTHERS CO.

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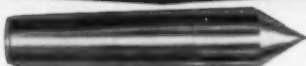
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## Center Column Grinder Has 80" O.D. Work Table

The Blanchard 80-A3 is a center column automatic surface grinder with 48" I.D. x 80" O.D. work table and three grinding wheel spindles. A finger-type feed control caliper maintains each wheel at correct height. Since the work table is nonmagnetic, all parts are held in fixtures during the grinding cycle.

Specifications include: motors—25, 30

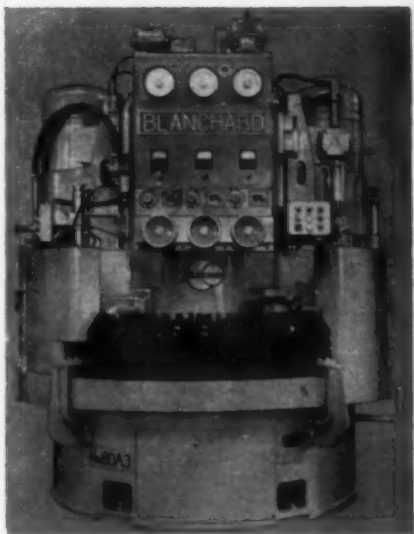
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The centers are hardened and ground. Write for specification sheet and price list. It will pay to take advantage of the savings available.

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**IOWA FALLS IOWA**

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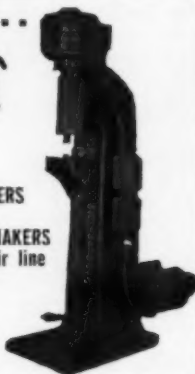
This model rough grinds both sides of both ends of automotive connecting rods.

## RIVETERS..

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**PIONEERS  
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PACEMAKERS  
in their line**

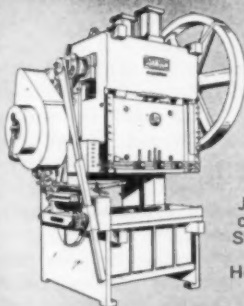


—head rivets from smallest to 1/2" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.

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**Johnson**  
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**JOHNSON MACHINE & PRESS CORP.**  
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MACHINE and TOOL BLUE BOOK

or 40 hp each spindle, 3 hp table; floor space—7' 8" x 8' 2"; feed—manual or power.

The Blanchard Machine Co., 64 State St., Cambridge, Mass.

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Stainless steel rings and discs machine-cut to size may be secured at a cost generally less than the price of

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Machine-cut stainless steel rings and discs.

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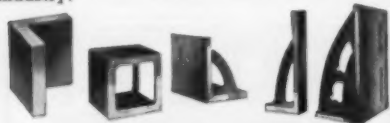
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Pulley drive provides wide spindle speed range.

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A wide range of spindle speeds is possible through the pulley drive arrangement. The compact 12"x21"x30" unit is mounted on a sliding base with 4" of end adjustment.

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**Triples Tap Life**—continuously ejects chips out of hole.  
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MACHINE and TOOL BLUE BOOK

matic controls and electrical controls with a push-button station.

Hartford Special Machinery Co., 287 Homestead Ave., Hartford, Conn.

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## Position Production Tables

A two way production table with plain air feed in both directions and a longitudinal 12" maximum stroke is illustrated. This Model No. 1 has no cross feed. It is equipped with hand control valve, cylinder, and flow control.



#1—air feed, both directions, 12" max. stroke.

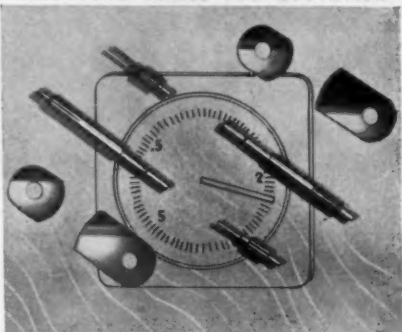
The manufacturer has two other models available also. The Model No. 2 production and layout table has air feed in both directions, a maximum longitudinal 12" stroke, and a 2" hand wheel cross feed. It is equipped with hand control valve, cylinder, and flow control. Drilling and layout table, Model No. 3, features hand feed screws in both directions, and longitudinal and cross feed.

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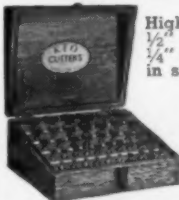
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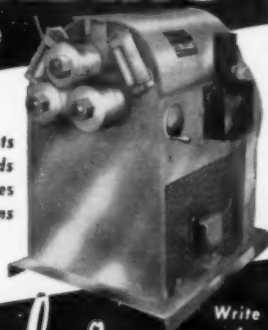
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MACHINE and TOOL BLUE BOOK



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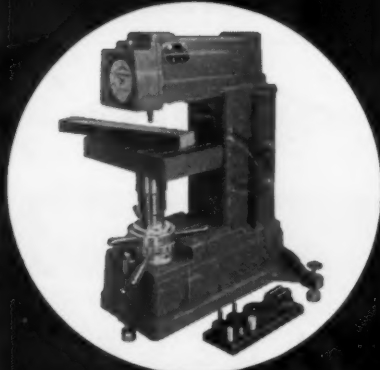
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The 80 Series Giddings & Lewis horizontal boring, drilling, and milling machines, with an 8" or 10" diameter spindle, feature vertical headstock travel in excess of 20', heavy-duty welded steel construction, and new operating advantages. These machines are reported capable of boring, turning, or facing over 12' diameters, developing 7½ hp per revolution, and can



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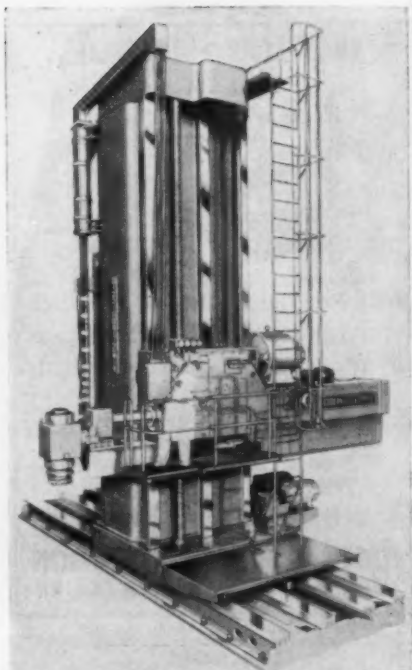
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Model 880-FUAR floor-type with an underarm.


be furnished with most types of automatic controls. Any type of programmed controls can be used to initiate and regulate all functions.

Illustrated is the Model 800-FUAR floor -type with an underarm. It has an 8" diameter spindle, 84" spindle underarm travel, 17' headstock travel, and 20' column travel. Other equipment and accessories on this machine include a 3-ton, 4-speed hoist, telescopic sights for viewing all scales and verniers, and a counterbalanced pendant station, to name a few features.

The four basic models in the 80 Series include floor-type, floor-type with underarm, floor-type with cross-sliding column, and planer-type machines.

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A 1½ hp electric motor drives a variable displacement hydraulic pump, through silent chain and sprocket, which



Speed control from 0 to 750 rpm.

in turn drives a fixed displacement hydraulic motor in a new variable speed drive. Rotation of hand wheel provides infinite speed control from 0 to 750 rpm. A reversing lever provides instantaneous rotational change. Reversing is independent of speed control.

Ball bearing motor, 1½ hp, is available in either three phase 60 cycle 220 volts, or single phase 60 cycle 220 volts capacitor type. Over-all dimensions are 12" long, 7½" wide, and 16½" high. Weight is 90 lb.

The unit is used for lathe heads, reamer drives, pumps, blowers, milling, test benches and many other uses.

Roberts Mfg. Co., 849 West Grand, Chicago 22, Ill.

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## Drill Units Have 6" and 10" Stroke

Two new Holomatic drill units, the 6" stroke Model 26 and the 10" stroke



## SPELLMACO "SPOTTERS"

A matched set of transfer punches for toolmakers, machinists & tool cribs

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—0025 undersize to facilitate use—Black oxide finish

Set of 3-17, 38 punches with indexed stand—sizes 3/32" to 1/2", by 1/64"—plus handy 17/32" size. Length 4 1/4" ONLY \$17.90  
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**R. L. SPELLMAN CO. - URBANA, OHIO**

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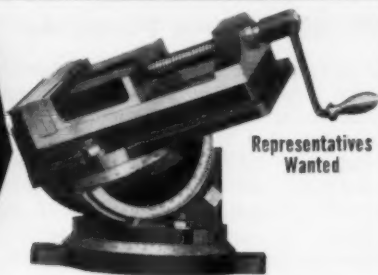
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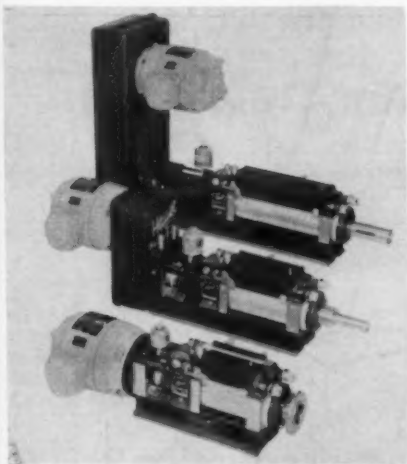
80 Batterymarch St.

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Drills 1/32" to 5/8" dia. holes in mild steel.

Model 210, along with the 4" stroke  
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reciprocating quill-type power devices for use on production drilling, reaming, facing and other similar machine applications. They can be used individually or in groups.

Concentric construction of the spindle, quill, hydraulic cylinder, air thrust piston and positive stop is said to assure maximum accuracy and long life.

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**AUTOM**

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**Offset Type**

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All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS  
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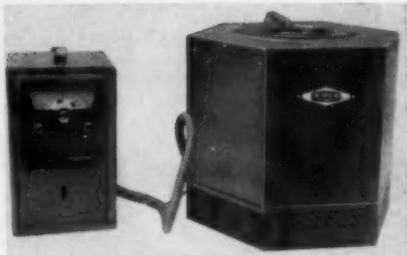
**SPECIFICATIONS**  
Open width 7/8" to 6"  
Gage Material .040 to .125  
Pin Diameter .101 to 3/8"  
Lengths to 120"

SEMI-OFFSET

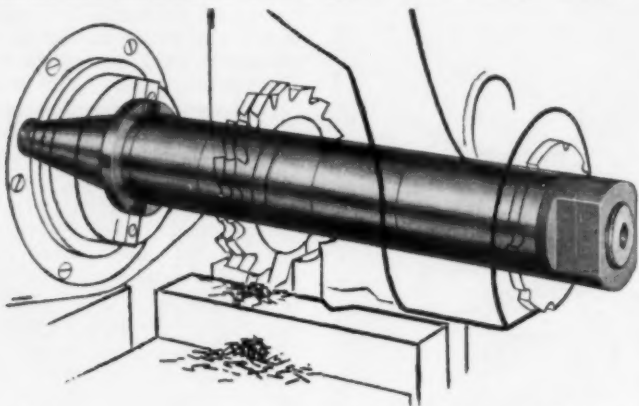
## Multi-Purpose Furnaces

Thermolyne top-loading electric furnace Type 2100 is adaptable for use as salt bath, melting, vertical muffle or crucible unit. Recommended laboratory and shop uses encompass investigative and pilot runs as well as short run production and the heat treating of small parts. The maximum chamber temperature for intermittent operation, 1900° F.

The basic unit includes the hexagonal furnace (115 or 230 volts, chamber 6½"



May be used as salt bath, melting, vertical muffle, or crucible furnace.



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dia. x 11" deep), stainless steel pot (6½" dia. x 7½" deep) with cover and convenient lifting handle, and thermocouple in protective tube.

The furnace case is of heavy-gauge welded and braced steel construction and is finished in corrosion- and heat-resistant enamel. Three separate types of insulation are so utilized as to minimize heat loss and maintain even temperatures. Heavy gauge nickel chromium heating coils held in re-

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The OW12-OMT optical dividing head is of robust construction, the spindle being mounted in solid bearings, and embodies a non-deflecting clamping

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**control feeding to  
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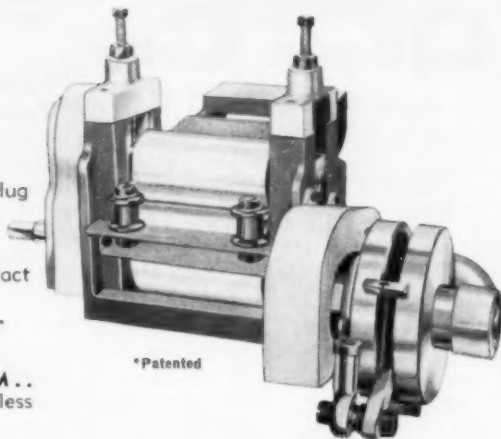
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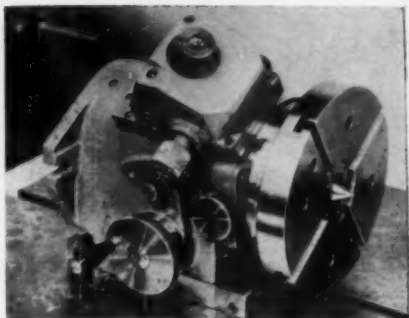
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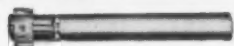
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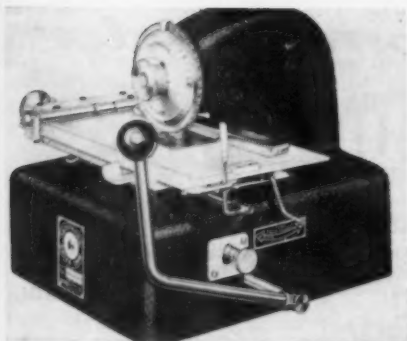


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and  
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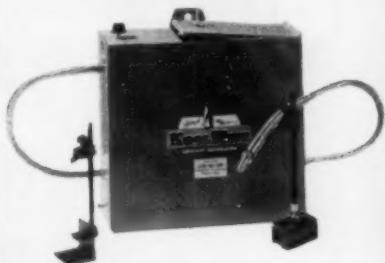
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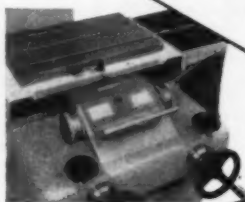
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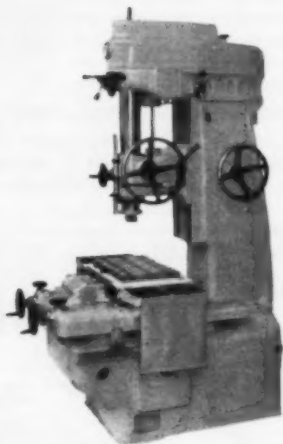
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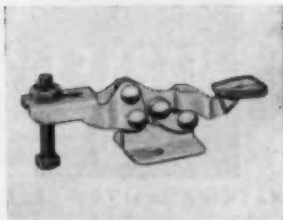
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MACHINE and TOOL BLUE BOOK

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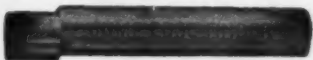
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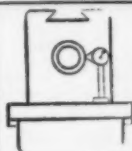
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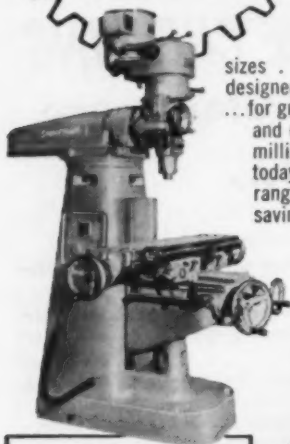


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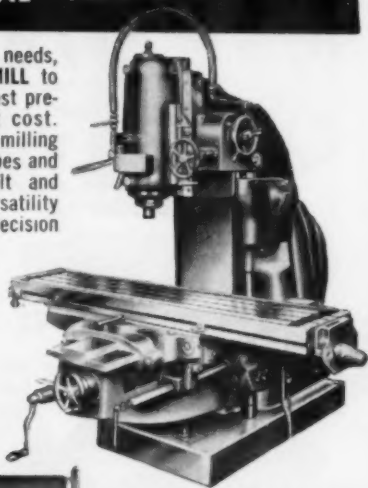
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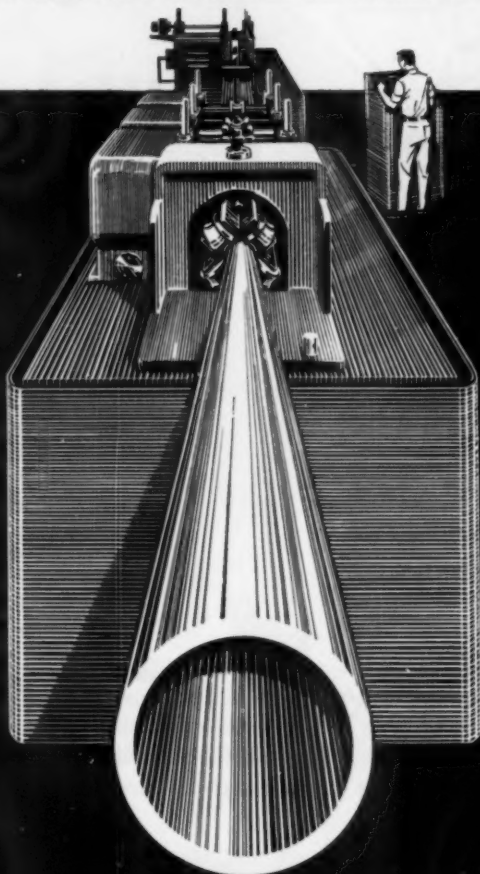
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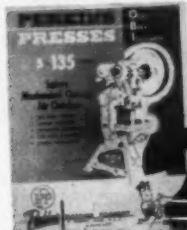
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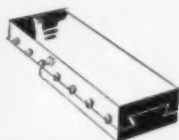


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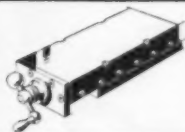
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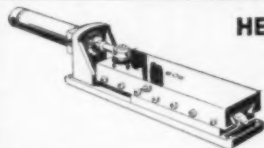
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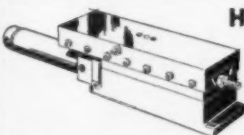
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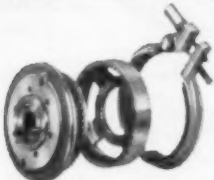
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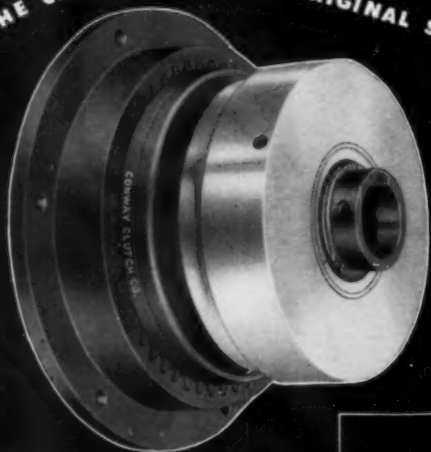
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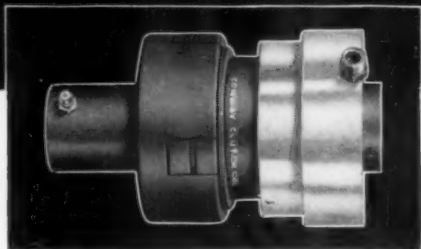
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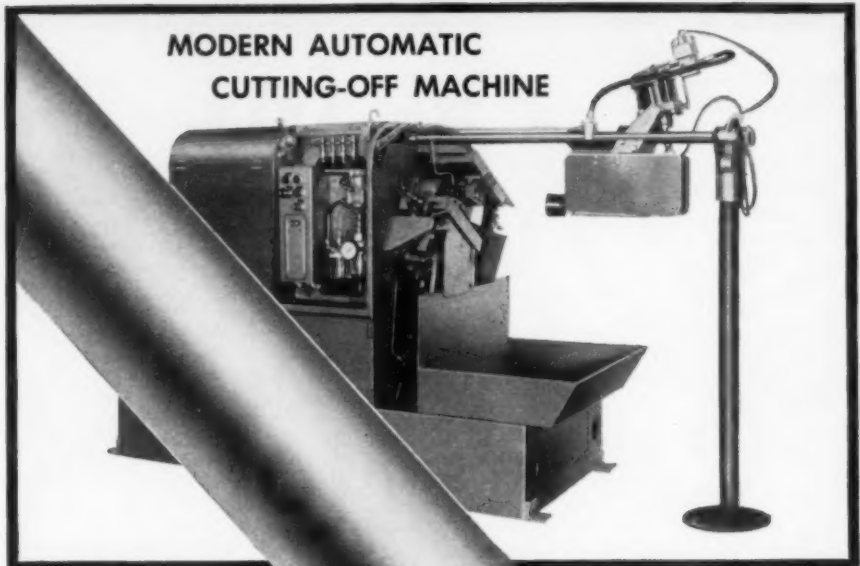
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SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
00	95	15/32	32	1-3/4	5-8-10-12-14-16-18-20-24
0	70-72-76-80	1/2	12-13-14-16-18-20-24-27-28-32-36-40	1-13/16	8-10-12-14-16-18-20-24-32
1	48-56-64-72-80-90	9/16	12-14-16-18-20-24-27-28-32-36-40	1-7/8	5-8-10-12-14-16-18-20-24
2	48-52-54-56-64-72-80	5/8	10-11-12-14-16-18-20-24-27-28-32-36-40	1-15/16	5-6-8-10-12-14-16-18-20
3	40-44-46-48-56-60-64	11/16	10-11-12-14-16-18-20-24-27-28-32-40	4-1/2	8-10-12-14-16-18-20
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SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
1	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-20-28	1-1/2	6-8-10-12-16-18-20
3	58	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
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10	24-27-32-40	7/8	9-12-14-18-20	1-7/8	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-15/16	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12		
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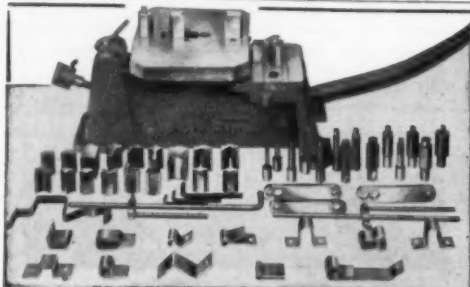
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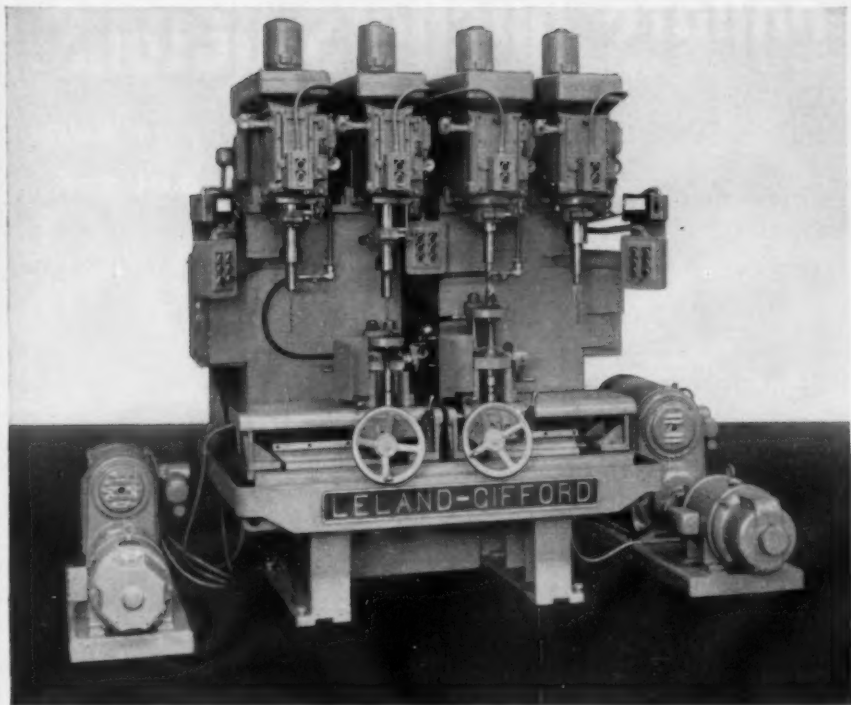
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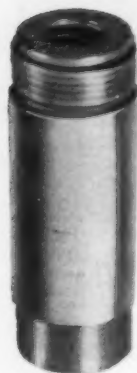
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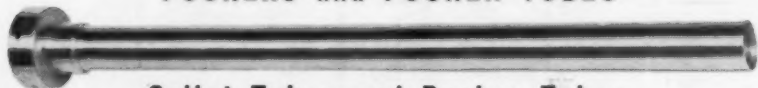
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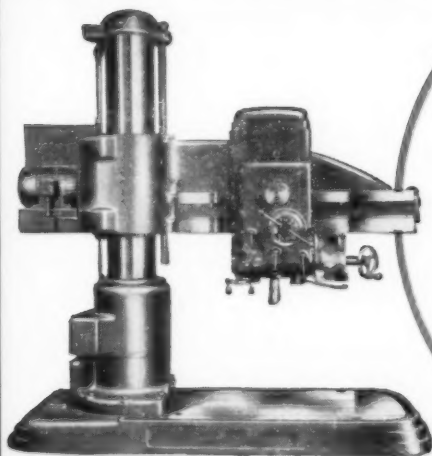
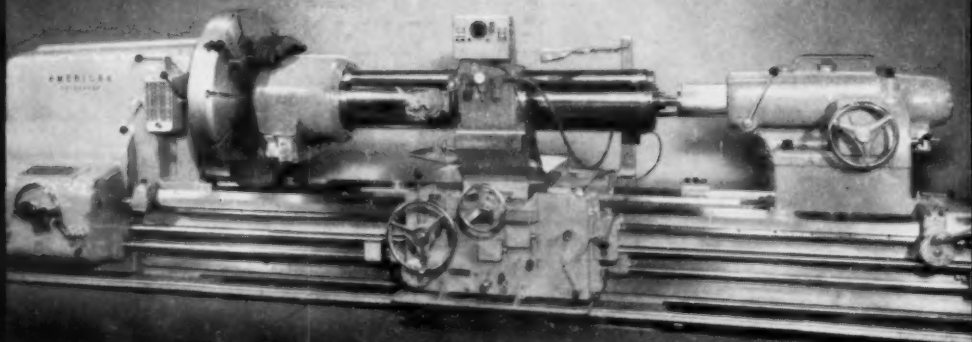
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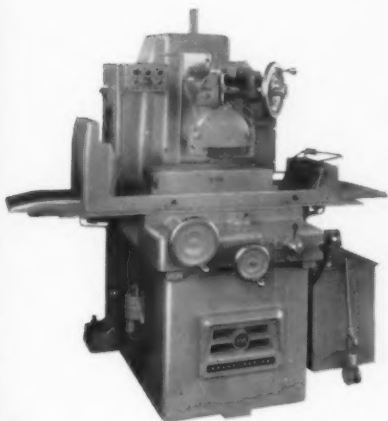
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